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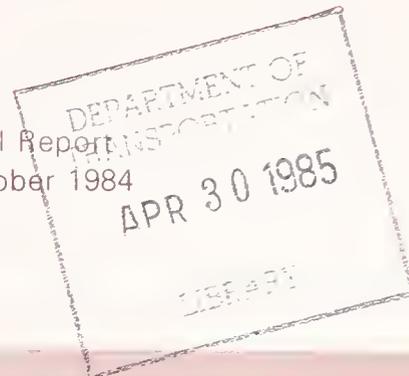
Department
of Transportation

Urban Mass
Transportation
Administration

Late-Night Shared-Ride Taxi Transit in Ann Arbor, MI

UMTA/TSC Evaluation Series

Final Report
October 1984



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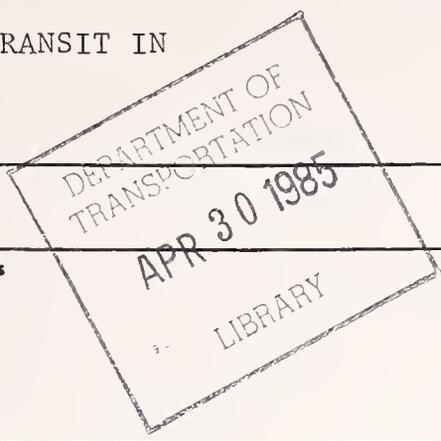
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16. Abstract <p>The Ann Arbor Transportation Authority introduced Night Ride, a late-night shared-ride taxi transit service, in mid-March 1982. The service was provided through a contract with a local taxicab company and funded through a demonstration grant from the Urban Mass Transportation Administration. Although the demonstration ended in December 1983, the authority decided to continue operating the service with local funding.</p> <p>Night Ride was initiated when community groups requested extension of Ann Arbor's evening dial-a-ride service to provide safe door-to-door transportation at night. The transit authority proposed the shared-ride taxi concept as a lower cost alternative since extension of dial-a-ride service hours was not viewed as feasible. The authority chose to contract for dedicated vehicles in order to fix the amount of the expenditure. To maximize ridership and make the service easy to use, cash fares were collected and retained by the operator. The fares helped to create an incentive for the operator to maximize productivity.</p> <p>Night Ride was a successful service in terms of ridership, cost and community acceptance. Ridership grew to 2339 passengers per month by the end of the demonstration, and the productivity reached a maximum monthly average of 4.2 passengers per vehicle hour. Although Night Ride was aimed at improving safety, most riders used it for other reasons, citing its low fare of \$1.50. Many were occasional users and usually had automobiles available for their nighttime trips. About 35% of the riders were male, which raised questions for some female riders as to the service's ability to insure safe transportation. However, it was not a major issue since many of the trips were work trips and very few riders reported traveling to or from bars. Riders and community groups were pleased with the service, despite the fact that wait times were rather long -- averaging about 17-25 minutes, but sometimes over one hour. The cost of service to the authority on a per passenger basis was estimated at \$2.15 excluding start-up costs, compared with \$4.79 for evening and Sunday dial-a-ride and \$1.27 for daytime fixed route service. The user share of Night Ride's operating cost was 43%, much higher than those of the other AATA services. The evaluation report concludes that, despite some site-specific factors, services like Night Ride should succeed in other communities with similar levels of nighttime travel demand.</p>					
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PREFACE

Night Ride was operated as a service of the Ann Arbor Transportation Authority (AATA) through a contract with a local taxi operator. The AATA obtained a grant from the Urban Mass Transportation Administration under its Service and Methods Demonstration Program to provide most of the funding necessary for service operation and data collection to evaluate the project. As a service to UMTA, the Transportation Systems Center of the U.S. Department of Transportation took responsibility for the evaluation and contracted with Multisystems to carry out evaluation activities and prepare this report.

Sources of information for this study include interviews and surveys of area residents and Night Ride users, AATA records, logs maintained by the Veterans Cab dispatcher, and discussions with representatives of various interest groups.

The author wishes to thank Mr. G. Christopher White, the Planning Director of the Ann Arbor Transportation Authority, for his invaluable assistance, Mr. Joel Freilich and Mr. Eric Schreffler of the Transportation Systems Center, and Ms. Mary Martha Churchman, the UMTA project manager, for their assistance to this evaluation study.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
sq in	square inches	6.5	square centimeters	cm ²
sq ft	square feet	0.09	square meters	m ²
sq yd	square yards	0.8	square meters	m ²
sq mi	square miles	2.6	square kilometers	km ²
acres	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
1/2 cup	1/2 cup	125	milliliters	ml
1 cup	1 cup	250	milliliters	ml
1/4 qt	1/4 quart	300	milliliters	ml
1/2 qt	1/2 quart	0.14	liters	l
1 qt	1 quart	0.95	liters	l
1 gal	1 gallon	3.8	liters	l
cu ft	cubic feet	0.03	cubic meters	m ³
cu yd	cubic yards	0.76	cubic meters	m ³

TEMPERATURE (exact)

°F	Fahrenheit temperature	5/9 (then subtract 32)	Celsius temperature	°C
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* In U.S.A. (Metric). For other exact conversions and more detailed tables, see NBS in U.S. Pub. 286, Units of Weight and Measure, Price 12 1/2. SO Catalog No. C-13 10 286.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	sq in
m ²	square meters	1.2	square yards	sq yd
km ²	square kilometers	0.4	square miles	sq mi
ha	hectares (10,000 m ²)	2.6	acres	acres
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	short tons
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

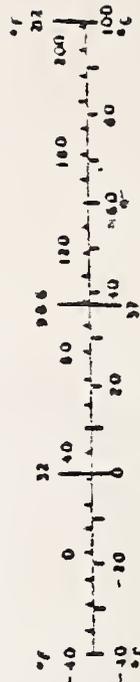


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EXECUTIVE SUMMARY

Introduction

This demonstration project used taxicabs to provide late-night shared-ride transit service subsidized by the local transit authority. Although shared-ride taxi services have been implemented throughout the nation, this was the first attempt to utilize the concept for late night transit.

The service, called "Night Ride," was initiated in response to a community request, spearheaded by the local public interest research group (PIRGIM). The impetus behind the request was concern about women's safety on the streets after a series of rapes had occurred. Although the original request was to extend the service hours of the evening Dial-a-Ride service which was in operation until 11 p.m., the Ann Arbor Transportation Authority (AATA) was convinced that such a service was too costly. In considering alternative ways to provide convenient and safe late-night transit, the AATA investigated the use of a contract with a taxi firm. While the primary objective was to meet the expressed demand for service, the demonstration project permitted the AATA to experiment with the use of a contract with a private operator.

The AATA applied for and received a grant of \$78,200 from the Urban Mass Transportation Administration under its Service and Methods Demonstration (SMD) Program for a one-year demonstration. The grant covered the full costs of administration, marketing, data collection, and 80% of the costs of the purchase of service contract. Multisystems, conducted the evaluation under a separate contract to the U.S. Department of Transportation's Transportation Systems Center, which is responsible for evaluations of SMD projects.

Project Setting

The City of Ann Arbor has a population of just over 100,000, in an area of 23.5 square miles. Located on the western fringe of the Detroit metropolitan area, the city has an identity of its own, strongly influenced by the University of Michigan. The university, whose campus is located in the center of town, contributes nearly 35,000 students to the city's population during the normal school year.

While the city has few industrial plants operating night shifts, the university medical center generates nighttime travel at its 11:30 p.m. shift change, when approximately 3000 nurses and other employees either start or end their workday. The university also generates late-night travel to and from its libraries, computer center, and north campus. Finally, the large number of students contribute to nighttime travel to and from a variety of locations. To meet the need for safe nighttime travel, the university instituted a special Nite Owl bus service in the mid-1970's; it operates until 2 a.m. in the vicinity of the main campus, and charges no fare.

While several incidents of sexual assaults on women in 1981 were instrumental in creating awareness of the safety problem in Ann Arbor, local police do not believe that the crime level in Ann Arbor is atypical of cities of similar size and character. It is noteworthy that institutions, such as the university and the hospital, have begun to provide better security, lighting, escort services, awareness classes, resource materials and crime monitoring.

Planning, Implementation and Operation

The AATA designed Night Ride to be:

- easy for passengers to use on an occasional basis,
- predictable in terms of annual cost, and
- easy to supervise.

As a result, it chose to contract for dedicated vehicles on a fixed cost per vehicle hour rather than to pay for services consumed, that is a cost per passenger served. It fixed the number of vehicles to be operated in any given hour of the night, although it did allow for changes to be made with AATA permission over the course of the project. Furthermore, the AATA decided to allow the operator to keep the cash fares and to submit an hourly subsidy bid on that basis. As an incentive to increase the ridership, the fares were set so as to be a

substantial portion of the taxicab company's revenue. (In fact, the fares and the subsidy contributed approximately equal portions to the total revenue.)

Implementation of Night Ride did not present any significant problem. It was probably much easier to implement the service with only one provider than with two, despite the AATA's earlier expectation that it was desirable to include roles for both local cab companies. Although the AATA had originally hoped that the two cab companies would agree to operate the service jointly, they did not. The AATA was therefore forced to choose a single provider through competitive bidding. The selection of a single provider did not result in any serious problem, because the losing bidder was generally in support of contract service, as a means of providing low cost transit service and shoring up taxi companies which were experiencing increasing costs and declining ridership.

The AATA union supported the introduction of Night Ride because they saw the social benefits of the concept and were aligned with the service's proponents. It did not oppose the AATA's contracting with a private operator since the AATA did not operate nighttime service and it realized that the service would be unlikely to be undertaken with AATA labor.

Once the service was implemented, the AATA made some changes in the number of vehicles operating at specific hours of the night to reflect the actual demand levels. There were some initial problems getting service to start promptly at 11 p.m. which contributed to long wait times throughout the night.

Service Quality

Night Ride was well received by its riders and the average respondent to user surveys rated the overall quality of service as "good." Wait time has probably been the most significant problem with Night Ride. Although wait time averaged in the 17-22 minute range for most of the demonstration, on some occasions passengers have had to wait one hour or longer. Accordingly, wait time was a frequent source of complaints in the user survey, with 27% of the respondents indicating that shorter wait times were needed and another 8% indicating that more vehicles were needed.

The fact that the number of vehicles in service was relatively fixed contributed to the long wait times. While the AATA agreed to adjust the numbers of vehicles from time to time, and modified the policy to allow some variation (provided the AATA was promptly notified), it did not permit the taxi

operator complete leeway. At the close of the demonstration, the AATA changed its policy to be more flexible, since it had gained confidence that abuse would not take place under such an arrangement and that if it did, it would be detectable.

The primary impetus for the implementation of Night Ride was the lack of safety on the streets at night, particularly for young women. Surveys conducted before implementation suggested that safety would be the primary reason for using the service for university students and hospital workers. However, surveys of actual riders revealed that safety was not the primary reason for use of Night Ride and that the service had found a substantial market due to its low fare.

While the service was designed to protect passengers from assault on the streets and was primarily oriented to women, as many as 35% of its passengers were male. Some female passengers felt that the male passengers should be dropped off first so the females' addresses would not be revealed; however, the AATA could not guarantee such a procedure. The service also required its riders to share a small vehicle with strangers; however for most passengers this did not seem to be a problem.

The incidence of assaults on women could not be used as a basis for evaluating the demonstration's success; this is due to concerns about the reliability of this information and changes in the degree and manner of reporting, as well as variation in the small numbers of reported incidents that might be due to other factors or random effects. On the other hand, the availability of Night Ride was welcomed by women's groups and security forces and that in itself suggests a perceived benefit to the community.

Travel Behavior

Night Ride's ridership, which consisted for the most part of occasional riders, grew substantially over the course of the project reaching 2339 riders per month in its last month of demonstration service. AATA was quite satisfied that the riders varied since it indicated that the service was useful to a large number of residents and consequently could develop a broad base of support. The fact that Ann Arbor is a university community probably had a significant impact on the quantity of ridership and its seasonality, but it is important to note that about half the riders were full time employees, many of whom were travelling to or from work. In fact, ridership by university students was less extensive than had been expected.

Interestingly, the primary reason for using Night Ride was not safety, but low cost, according to results of a survey of riders. It is likely that the reason for this surprising result lies in the fact that the flat fare offered a bargain to those making the longest trips. These riders used the service as an alternative to other vehicular modes rather than walking and therefore safety was not the key issue to them. Had the fare been distance-based, the trips served and thus the reasons behind the mode choice might have been different.

The fact that safety was not the primary reason for using Night Ride may also raise questions about its success in meeting its objective. While it was originally suspected that Night Ride would divert trips from walking and serve latent demand for trips that were not being made or were made earlier due to fear about street crime, the data do not indicate that this was often the case. Although most of the students in the follow-up panel surveys did indicate that safety was their primary reason for using Night Ride, the follow-up surveys were probably performed too soon after the service was initiated to provide really useful data on how many students did not use the service and why they did not.

As many as one half of the Night Ride users usually had a vehicle alternative available for their nighttime trips. Thus, Night Ride has a substantial number of riders who either chose to use Night Ride or had a temporary problem with their vehicle, i.e., their car broke down or was needed by another household member. In fact, most users indicated that the latter was the case. When asked what their alternative would be if Night Ride were unavailable, the overwhelmingly majority indicated regular taxi. This may imply that many Night Ride passengers were diverted from taxis on the night in question, despite the fact that taxi was not their usual mode; perhaps for some others, Night Ride introduced the taxi mode as a potential alternative, where it had not been previously considered.

Operator Productivity and Economics

The AATA designed the Night Ride purchase of service contract with the taxi operator so that the costs to the AATA would be fixed over the budgetary period. This was an important aspect of the project design, since Night Ride was a new service and was directed at a relatively unknown market.

The AATA left the projection of ridership demand up to the taxi companies, assuming that they had the most experience with and information about late-night travel in Ann Arbor. The

productivity in the first year was actually considerably lower than the 4.5 passengers per vehicle hour assumed in the original Veterans Cab bid. In the second year, the subsidy was increased from \$6.00 to \$7.50 per vehicle hour to make up for the lower productivity; in fact, productivity increased reaching a high of 4.2 during at least one month and revenues per vehicle hour exceeded those assumed in the original bid even allowing for inflation. As a result, profitability of Night Ride on a monthly basis was achieved in the closing months of the demonstration.

The costs of Night Ride proved to be quite reasonable when compared with those of dial-a-ride. For example, the subsidy per passenger on Night Ride was only \$2.15 compared to \$4.79 on the general public dial-a-ride. The user share of Night Ride's total operating cost was 43% which is almost twice that of fixed-route and six times that of the general public dial-a-ride. The AATA spent \$33,184 (in fiscal year 1983), which is 0.5% of its total budget to carry 0.5% of its total passengers.

Transferability of the Results

Several characteristics of Ann Arbor and of this project's design are likely to have influenced the results of the demonstration and may limit the transferability of the results. These include:

The University Setting: The University had a number of influences on the project. The level of nighttime travel in Ann Arbor is in part a result of the University, due both to activities it offers and the fact that it swells Ann Arbor's population in age groups that are most likely to travel at night. The University colors Ann Arbor's politics and its cultural atmosphere making Ann Arbor somewhat different from other cities of the same size. It is easy to imagine that other cities without a university would have a lesser demand for a nighttime taxi service.

The Existence of Evening Dial-a-Ride: The existence of evening dial-a-ride served as a natural bridge between daytime fixed-route transit and Night Ride. Its existence may have encouraged residents to accept the idea of sharing a small vehicle in door-to-door service. In communities without such service, it is possible that Night Ride might not have caught on so quickly.

Crime and Safety Issues: Several incidents raised the consciousness of the community with regard to the safety of women traveling in nighttime hours. Had these incidents not occurred and had the community not reacted strongly to this issue, Night Ride would most likely not have been implemented. On the other hand, since so few passengers indicated that their primary reason for using Night Ride was safety, one might conclude that once the service was initiated, Ann Arbor's safety and crime environment had little to do with the project's success.

Although several site-specific factors contributed to Night Ride's implementation, and played a role in its ability to attract riders, its success is largely attributable to the service design and the availability of nighttime travel demand. This suggests that once the initial barriers to implementation are overcome, services of similar design should be successful in other cities where there is demand for nighttime travel.

Conclusions

The concept of late-night shared-ride taxi transit has proven quite successful in Ann Arbor. Ridership grew over the 22-month demonstration period to a high of 2,339 riders in the last month. Except for seasonal variation, the increases were sustained over time. Enough riders were attracted to require the taxi company to add additional vehicles.

Although there is little comparative late-night experience, Night Ride's productivity, which reached a maximum monthly average of 4.2 passengers per vehicle hour, was nearly as high as those of several daytime shared-ride taxis operating at much higher demand densities. The productivity increased over time to levels approaching the optimistic projections of the cab company that won the contract.

The AATA was able to offer a needed service at a subsidy that it could afford and which was easy to estimate for budgeting purposes. The per passenger subsidy for Night Ride actually proved to be less than half that for the AATA's evening and Sunday general public dial-a-ride service (and much less on a percentage-of-cost basis). At the end of the demonstration period, the AATA decided to continue operating the service with local funding.

1. PROJECT BACKGROUND AND DESCRIPTION

This evaluation report documents and assesses the design, implementation and operation of a night-time shared-ride taxi transit service in Ann Arbor, Michigan, funded by a grant from the UMTA Service and Methods Demonstration Program.

1.1 BACKGROUND OF THE SERVICE CONCEPT

This project is an example of a transit authority using a contract with a private operator to provide expanded service at low cost. At the same time, it illustrates the potential of taxi service to meet certain transit needs. In this particular application, subsidized shared-ride taxi service was used to meet demand for safe nighttime transit service.

Shared-ride taxi is a form of service in which taxis are legally permitted to carry two or more passengers having different origins and destinations. In such an arrangement, fares are set so that passengers willing to share a ride--and hence face the possibility of a slightly longer trip--are charged less than they would be for an exclusive-ride. This fare reduction can make taxi service affordable to many persons unable to pay existing premium fares. At the same time, if the taxi driver carries two or more riders, each paying more than half the regular fare, total revenue for a particular trip will be greater than if only one passenger were transported. In Ann Arbor, a subsidy from the transit operator enabled the fare to be particularly low and thus allow the service to substitute for transit. Other applications of shared-ride taxi involve unsubsidized operation.

Despite the potential advantages to all parties concerned, however, the shared-ride concept has been introduced in relatively few locations to date. It remains illegal in many cities, and operators have been slow to introduce the service in some of the locations which have modified their regulations to allow this type of service (e.g., Seattle, San Diego and Dade County). There are several possible explanations for this

situation: 1) many taxi operators are simply reluctant to try new approaches; 2) the grouping of rides makes shared-ride scheduling and dispatching considerably more complex than for exclusive-ride service; 3) few taxi companies have the marketing ability or resources to effectively promote a new service; and 4) most taxi operators are unwilling to accept the risk of losing revenue on trips where a shared-ride fare is guaranteed but multiple fares (sharing) are not assured. These barriers notwithstanding, the taxi industry in general has recognized the need to diversify and innovate to raise revenues while controlling costs. Concepts such as shared-riding offer promise, both as a means of reviving the taxi industry and as a cost-effective complement to public transit. As a result, the Urban Mass Transportation Administration (UMTA) has considerable interest in assessing practical applications of shared-ride taxi as transit service.

1.2 PROJECT DESCRIPTION

This project provided late-night transit service using shared-ride taxicabs under a service contract. A series of rapes in the Ann Arbor area in 1980 stirred community groups to lobby for low cost transportation service during late-night hours. At that time, only exclusive-ride taxicab service was available to city residents after 11 p.m. Local groups apparently felt that regular taxi service was too expensive for a substantial proportion of local residents, many of whom are students. While the late-night service was to be more expensive than regular public transit service operated during day and evening hours, its \$1.50 fare still represented a substantial discount on the average in-city taxi trip, which costs about \$4.00. Although women were seen as the primary beneficiaries of the service, it was open to the general public.

Public transportation service in Ann Arbor is provided by the Ann Arbor Transportation Authority (AATA). At the time the project began, AATA operated 15 bus routes Monday through Saturday until 6:45 p.m., and general public dial-a-ride service Monday through Friday from 6:45 to 11:15 p.m. and Sunday from 7:30 a.m. to 6 p.m. Fares were \$0.60 on both services, but most passengers either used tokens which provided a 25% discount or were eligible to ride for half the regular fare.

The demonstration service was available to the general public for travel door-to-door within the city limits between 11 p.m. and 6 a.m. seven days a week. Night Ride was provided by one of the two city-licensed taxicab companies chosen by competitive bid; the taxicab company was permitted to retain all passenger fares in addition to receiving a per vehicle hourly rate from AATA for providing dedicated vehicles.

The AATA was awarded \$78,200 by UMTA to conduct the demonstration, which began March 15, 1982, and ended on December 31, 1983. The grant covered 80% of the subsidy, and all marketing, administration and data collection expenses.

1.3 OBJECTIVES

The AATA had several objectives in offering Night Ride Service:

- to provide convenient and safe, late-night transportation for women, students and night shift workers;
- to respond to an expressed need for service and thereby cultivate a responsive public image;
- to establish a cooperative relationship with the taxi industry.

However, there were secondary objectives as well:

- to explore alternatives to publicly-operated Dial-a-Ride;
- to expand service hours at low cost.

In addition to AATA's specific objectives, the demonstration addressed a number of objectives of the Service and Methods Demonstration program. For example, the project aimed at improving the temporal coverage of the transit system, and making use of the private sector wherever appropriate.

1.4 NATIONAL PERSPECTIVE OF DEMAND RESPONSIVE TRANSIT

Shared-ride taxi services evolved from the development of demand responsive transit (DRT) systems in the early 1970's. The growth of DRT was founded on two basic premises: 1) that the lower density development patterns predominating since the 1950's required a form of public transportation more flexible than fixed-route service, approaching the flexibility of the auto; and 2) that this flexible service could be integrated with fixed-route service to form a regional transit network in large metropolitan areas. After considerable research and several demonstration projects (including one in Ann Arbor), however, DRT has not proven to be a panacea for suburban transportation needs. Except in California, application of the concept has not been widespread, since costs have proven higher than originally expected and the anticipated demand has never materialized.

The high operating costs of DRT services and the deteriorating financial situation of the taxi industry, as well as the taxi industry's fear of (what it views as) competition

with public DRT systems, has given taxi companies both the opportunity and the motivation to contract with transit authorities and other public agencies to provide demand responsive transportation services. In several cities, the result of this cooperation has been shared-ride taxi service.

Although a few shared-ride taxi operations have been privately run for years, they are typically publicly subsidized. Subsidies may be provided to the operator or directly to the users. Provider-side subsidies may be given at a fixed rate per unit of available service (e.g., vehicle-hours) or at a rate based on services consumed (e.g., passengers carried). User-side subsidies may be provided in the form of scrip or coupons distributed to potential riders and redeemable for transportation services.

The usage of the vehicle fleet varies among shared-ride taxi services. Vehicles may be dedicated entirely to shared-ride services or integrated with the rest of the operator's fleet and used for both shared-ride and exclusive-ride services. Both of these concepts are currently in use.

Dedicated fleets usually have distinctive markings which foster public recognition. With dedicated vehicles, subsidies are typically based on vehicle-hours of provided service rather than riders served; however, this gives the operator little incentive to maximize ridership and system productivity.

Integrated fleets, on the other hand, can serve both the exclusive-ride and shared-ride markets. Subsidies, in such cases, are typically based on ridership, providing the operator more incentive to improve productivity; however, the system may lack the visibility often required to attract ridership and the subsidy may be too unpredictable for sponsor agency budgeting purposes.

Although there is currently no complete inventory of shared-ride taxi services, many systems do exist. There are a few private (unsubsidized) systems (the most well-known being in Little Rock, Arkansas and Davenport, Iowa) and there are many more subsidized systems (particularly in California, one state which has actively encouraged innovative approaches to transit where traditional transit service is not appropriate).

A major factor contributing to the efficiency of shared-ride taxi is the use of low-cost labor employed by private operators. Their wage rates are far below those of public transit employees. In addition, taxi systems generally have more flexible work rules. Additional cost savings over public operation may result from the fact that private

operators have existing vehicles and dispatching capability. Low cost and high efficiency have been the major points in favor of shared-ride taxi; however, poor utilization of vehicles has yielded low productivity and high per passenger cost in many cases. Disappointing performance is often attributed to poor dispatching procedures inappropriate for shared-ride operation. This is a potential area for improvement.

The choices made with regard to type of subsidy and fleet have important impacts on the effectiveness of the system. The successful implementation of shared-ride taxi depends primarily on the ability of the system to capitalize on the inherent low cost and high efficiency of private taxi operators in order to create an effective transportation mode.

1.5 EVALUATION ISSUES

By instituting the demonstration service, AATA demonstrated its responsiveness to an expressed public need to increase public safety during late-night hours. In addition to assessing the extent to which the demonstration met this objective, this evaluation study addresses a variety of project-related issues, which can be segregated into four categories: level of service; travel behavior; transit operations; and other effects.

Level of Service

- What was the impact of the demonstration on the safety of late-night travel?
- What were the cost impacts on different user groups participating in the demonstration?
- Were response and travel times acceptable for late-night travel?

Travel Behavior

- What percentage of the existing late-night travel market did the demonstration project serve? To what extent did service ridership represent a mode shift from exclusive-ride taxi service? To what extent did it represent a shift from other travel modes?
- What tradeoffs did individuals make between cost and convenience, cost and safety, and safety and convenience in choosing late-night travel modes?

- Did the service induce tripmaking among individuals who formerly did not travel at night? Did it increase tripmaking by existing late-night travelers and/or enable them to travel to new locations? Did the service enable existing travelers to travel later?
- What was the trend in ridership over time? Was there a marked seasonal impact?

Transit Operations

- What were the costs associated with the demonstration? How did the costs of providing the subsidized shared-ride taxi service compare with the costs of providing other components of AATA services? Was the fare structure appropriate?

Private Operator Impacts

- Was the private operator able to provide the service at a profit?
- Was there an impact on the operator's exclusive-ride taxi operation?

Other Impacts

- How did the demonstration affect the other local taxi operator's ridership and revenues?

1.6 SOURCES OF DATA USED IN THE EVALUATION

In order to provide data for the evaluation of the project, the AATA required the Night Ride operator, Veterans Cab, to keep detailed logs of Night Ride's demand for service, on-time performance and ridership. The logs were the basis for AATA monthly reports; for limited periods, the logs themselves were used for more detailed analysis. Yellow Cab, the other taxicab company, provided figures on its daytime and nighttime ridership changes before and during the Night Ride project.

Direct surveys were also carried out as part of the project and provided a large part of the data needed for the evaluation. In order to document existing conditions as a baseline for the measurement of the impacts of the demonstration, "before" surveys of potential service users were conducted by the AATA. These surveys identified individuals' travel patterns and behavior during the late evening and night, prior to Night Ride; assessed their attitudes and preferences concerning various available travel modes, and attempted to estimate the ridership response to the new service. The

surveys were designed to establish a "panel" of respondents who would be contacted at a later point in the demonstration to measure their response to and attitudes towards the service, and to compare their predicted and actual behavior. The surveys focussed on patrons of the city's major late-night activity centers - the university hospital, the computing center, and the libraries - and on patrons of AATA's zonal dial-a-ride service, which operated (before and during the demonstration) until 11:15 p.m. Surveys were self-administered and took five to ten minutes to complete. Only the university panel was re-surveyed as planned.

A follow-up survey of the panel took place very soon after start-up in order to recontact students before the end of the school year. Unfortunately, there was not a sufficient response to make follow-up surveys of the hospital and dial-a-ride panels feasible.

User surveys were conducted the following year. These consisted of mailback surveys distributed by the taxi drivers to Night Ride passengers in February 1983. Because of a low response rate to the mailback survey and concern over response bias, a second user survey was conducted in April. These took the form of in-vehicle passenger interviews.

Details of the survey efforts are described in the appendix.

2. PROJECT SETTING

2.1 GENERAL CHARACTERISTICS*

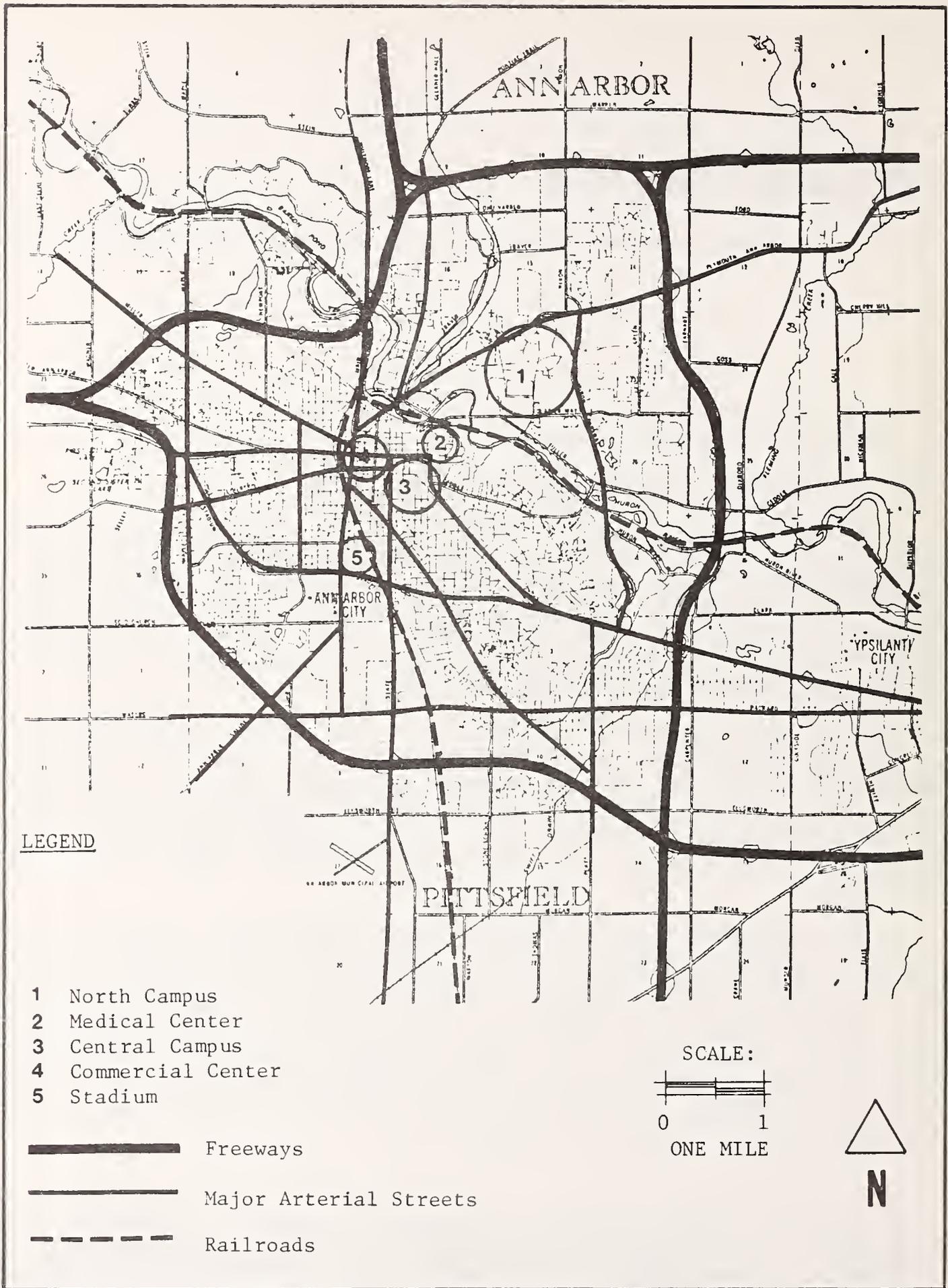
2.1.1 Geography and Demography of Ann Arbor

Ann Arbor is located 38 miles west of Detroit in Washtenaw County and has an area of 23.5 square miles (see Figure 2-1). The 1980 census lists the city's population as 107,960 persons, indicating a density of 4,595 persons per square mile. The largest community in close proximity to Ann Arbor is Ypsilanti, located directly to the east with a population of 24,031 persons and an area of 4.1 square miles.

While Ann Arbor is located at the western edge of the Detroit metropolitan area (which contains over 4.5 million people or about 50% of the population of Michigan), the city maintains a strong physical and cultural identity of its own. Ann Arbor is also fortunate in having a strong tax base made possible by its power to annex surrounding land as it is developed.

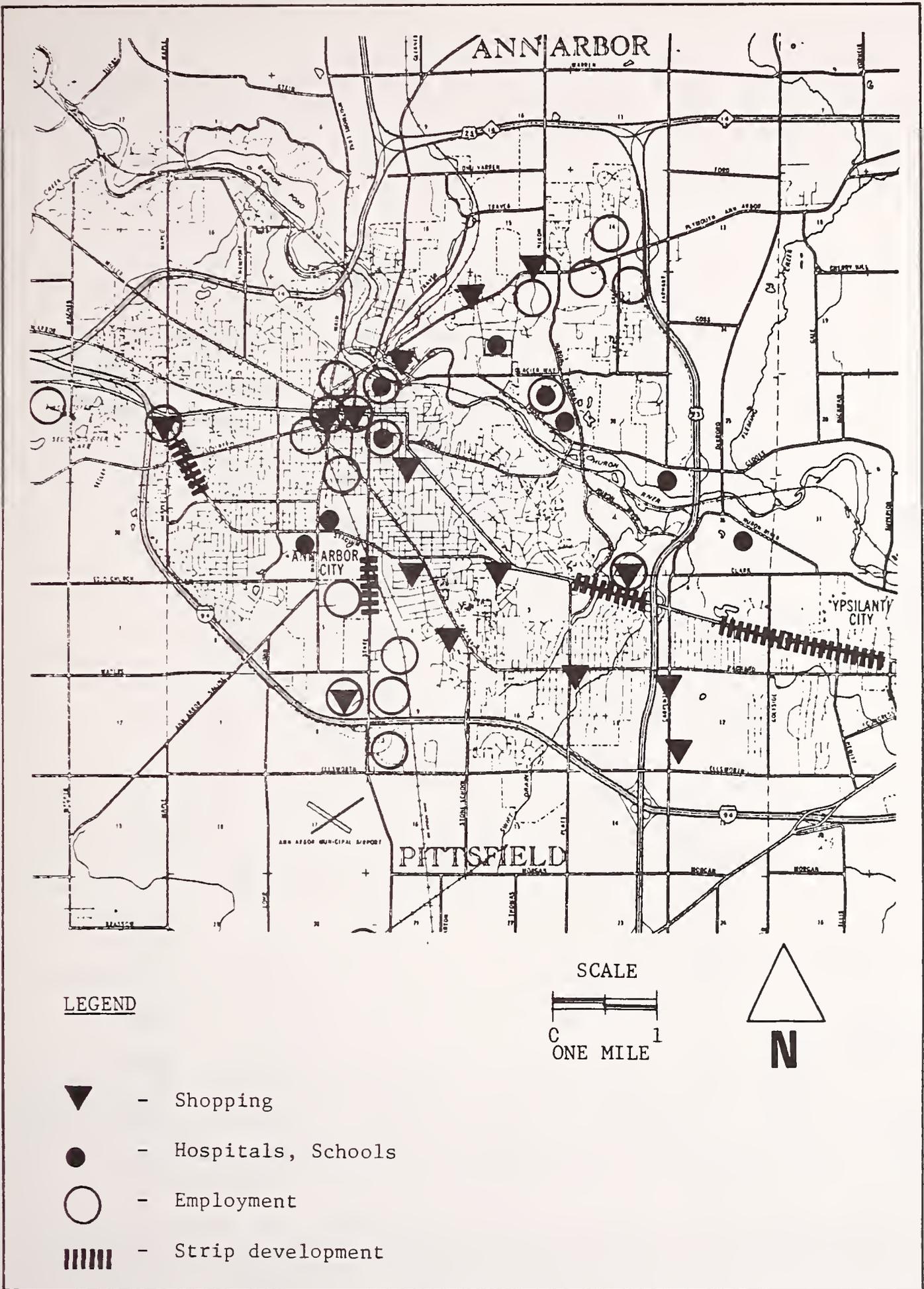
The downtown area contains two commercial centers, one located on State Street at the edge of the University of Michigan campus and the other on Main Street five blocks away. New commercial developments have slowly decreased the separation between these two centers. More recently, construction of a number of large suburban shopping centers has shifted some retail activity away from the downtown. The location of major shopping and employment centers and other trip generators is shown in Figure 2-2.

* Portions of this section are derived from: L. Neumann, J. Wojno and R. Juster, Integrated Dial-a-Ride and Fixed-Route Transit in Ann Arbor, MI, Report No. UMTA-MA-06-1083-77-1, prepared for USDOT, UMTA and TSC by Cambridge Systematics, Inc. and Multisystems, Final Report, March 1977.



Source: Neumann et al, op. cit.

FIGURE 2-1. MAP OF ANN ARBOR



Source: Neumann et al, op. cit.

FIGURE 2-2. MAJOR SHOPPING AND EMPLOYMENT CENTERS

Ann Arbor has fairly cold winters, with temperatures generally below freezing and considerable snowfall. Meteorological data for Ann Arbor are shown in Table 2-1.

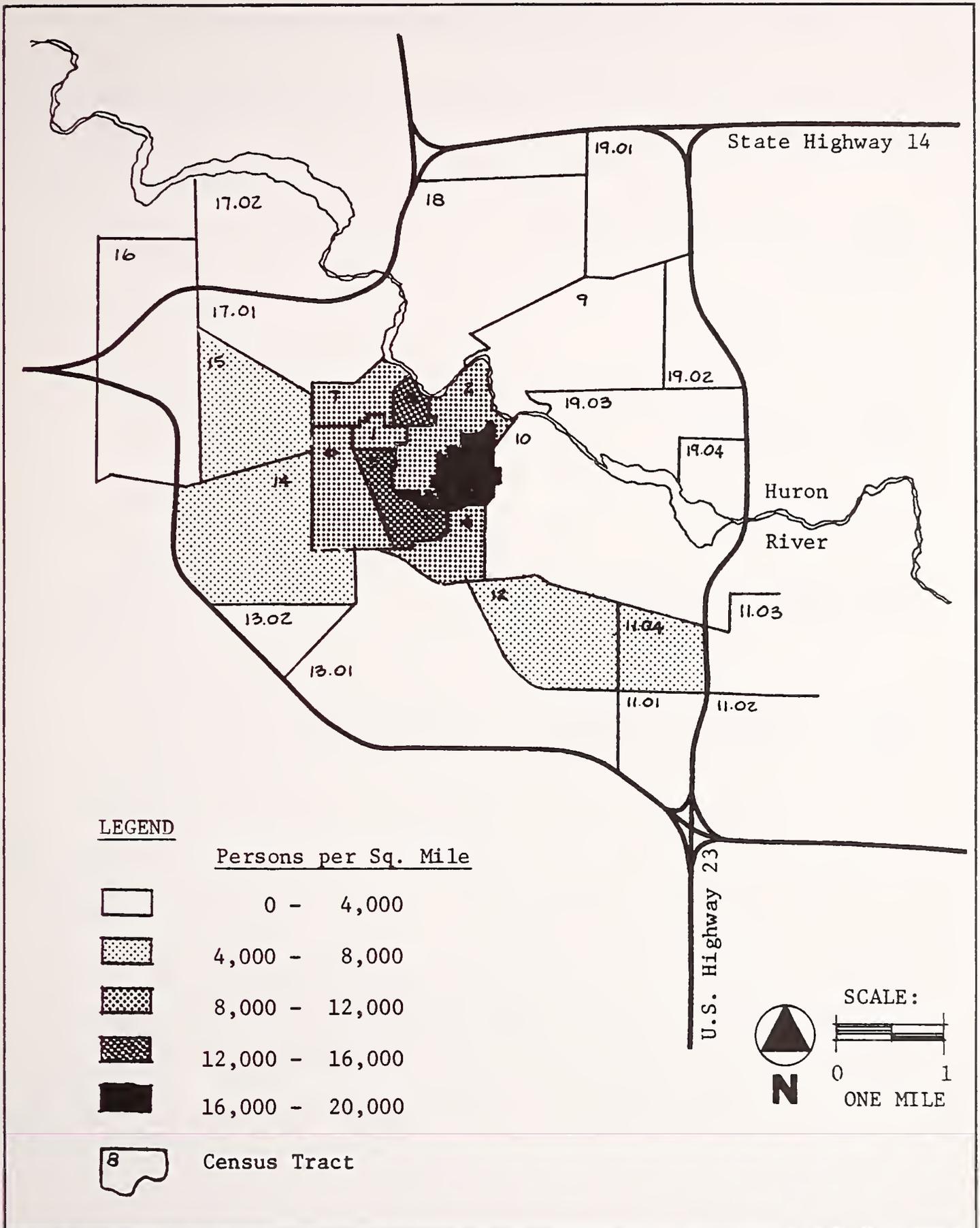
TABLE 2-1. METEOROLOGICAL STATISTICS FOR ANN ARBOR (30-yr. average, 1940-1969)

MONTH	AVERAGE DAILY TEMP.		AVERAGE MONTHLY	MEAN PRECIPITATION (water	MEAN SNOW-	MEAN NO. DAYS
	°F		TEMP. °F	TATION (equiv.) (inches)	FALL	0.10 INCH
	Max.	Min.			(inches)	PRECIPITATION
Jan.	31.8	17.8	24.8	1.81	7.3	5
Feb.	34.2	19.1	26.7	1.65	6.6	4
Mar.	43.8	26.4	35.1	2.31	5.4	6
Apr.	58.5	37.8	48.2	3.21	1.1	7
May	69.7	48.1	58.9	3.25	0.1	7
June	79.8	58.2	69.0	3.10	0.0	7
July	83.4	62.0	72.7	2.91	0.0	5
Aug.	81.5	60.5	71.0	2.78	0.0	6
Sept.	74.4	53.4	63.9	2.19	0.0	5
Oct.	63.7	43.9	53.8	2.49	0.0	5
Nov.	47.7	32.7	40.2	2.25	3.0	6
Dec.	35.4	22.4	28.9	2.15	6.0	5
TOTAL	NA	NA	NA	30.10	29.5	68

Source: Neumann et al, op. cit.

The geographic distribution of the population is shown in Figure 2-3. The population density is greatest and average family income is lowest in those tracts close to the downtown area. The greatest concentration of elderly individuals is directly northeast of the central business district (CBD).

In large part because of the presence of the university, the population of Ann Arbor is younger, better educated, and wealthier than the national average, as shown in Table 2-2. More detailed data on the sex, age, education and income characteristics of Ann Arbor's population are shown in Table 2-3. The university also influences Ann Arbor's



Source: Neumann et al, op. cit.

FIGURE 2-3. POPULATION DENSITY

TABLE 2-2. ANN ARBOR COMPARED TO THE NATION

Characteristic	Ann Arbor	U.S. Totals
Median Income of Families (Dollars)	\$25,202	\$19,828
Median Age (Years)	25.2	30.0
Persons 65 Years Old and Over (Percent)	5.9	11.3
Black (Percent)	9.4	11.7
Not Completing High School (Percent)	9.3	31.4

Source: 1980 U.S. Census

TABLE 2-3. DEMOGRAPHIC DATA

Total Population	107,960
<u>Sex</u> (Percent)	
male	50.2
female	49.8
<u>Age</u> (Percent)	
under 20	27.4
20-44	55.0
45-64	11.7
65 & over	5.9
<u>Race</u> (Percent)	
Black	9.4
Spanish heritage	1.9
<u>Education</u> (Percent)	
no schooling or grade school (1-8) only	4.3
some high school (9-11)	4.9
high school diploma (12)	16.2
some college	18.3
college degree or more	56.2
Total Families	21,141
<u>Family Income</u> (Percent)	
less than \$5,000	4.0
between \$5,000 and 9,999	8.6
between \$10,000 and 14,999	11.4
between \$15,000 and \$24,999	25.5
\$25,000 and over	50.5

Source: 1980 U.S. Census

employment characteristics. About 37% of Ann Arbor's workforce are employed in the government sector with a rather low proportion, about 12%, in manufacturing and industry. Of the approximately 55,000 employed persons living in Ann Arbor, 70% work within the city.

In 1980, Ann Arbor had a total of 38,945 occupied housing units with an average of 2.4 persons per unit. About 38% of the housing units have had a change of occupancy within the last year caused in part by the large transient population associated with the university. Table 2-4 provides more detailed data on the city's housing units.

The older residential areas of the city are comprised primarily of single family homes. Near the university campus many of these single family structures have been converted to apartments. In outlying areas, many large apartment and condominium complexes have been constructed, originally to house overflow from the Detroit area; now they serve as inexpensive apartments for students and low income residents. The university houses about 10,000 students in dormitories, about 2,300 of whom are at the North Campus. Most students live off-campus, not always by choice since there have been no vacancies in university residence halls for years. (This might increase the demand for Night Ride among university students.)

2.1.2 The Roles of the University and Hospital

The University of Michigan is a major influence in Ann Arbor's cultural atmosphere. It provides the city with many cultural opportunities and contributes to the local political climate. For example, Ann Arbor was one of several centers of the anti-war movement in the 1960's and early 1970's, and has been a leader in the environmental movement. During the height of the student protest the Human Rights Party, a student-oriented party, won two seats on the City Council.

The university currently has an enrollment of 35,000 and employs a staff of over 10,000. The university owns 10.4 percent of the land in Ann Arbor. One third of the city's population has a direct connection to the University; indirectly, many others provide services to the university community or use its resources. Over 45 private research firms, employing 3,600 persons, and eight government research laboratories have located in Ann Arbor. As a result, the city has a national reputation as a major research center. The university medical center is the city's most significant generator of state and interstate travel.

As shown in Figure 2-1, the university facilities are split between two campuses, one north of the Huron River and the other near the central business district (CBD). The university medical center is located just north of the central campus.

TABLE 2-4. HOUSING UNIT DATA

Number of Housing Units	40,153
-------------------------	--------

Occupancy Type (Percent)

owner occupied	40.4
renter occupied	56.6
vacant-year round	3.0

Number of Occupied Housing Units	38,945
----------------------------------	--------

Occupancy Rate (Percent)

1 person	28.6
2 person	34.3
3 person	16.1
4 or more	20.9

Years in Residency (Percent)

less than 1 year	37.5
more than 1 year	62.5

Source: 1980 U.S. Census

2.1.3 Nighttime Employment and Travel Patterns

Unlike many similar-sized cities of the midwest and northeast United States, Ann Arbor is not a manufacturing city and has no major industrial plants to generate nightshift travel. Ann Arbor's nighttime travel is primarily due to the hospital and university as well as restaurants and bars.

Nurses and some other hospital staff have fairly typical shift times: 7:30-3:30, 3:30-11:30, 11:30-7:30. Thus, those beginning or ending shifts at 11:30 p.m. would find the Night Ride service useful. Of 5,250 employees, about 1,575 work the night shift on any given night and a similar number work the evening shift.

While university activities are primarily daytime oriented, several libraries and the computing center generate late-night travel. The graduate library is open until midnight Sunday night through Thursday night. The computing center is open 24 hours a day and experiences heavy use between 10 p.m. and 3 or 4 a.m. Note that the university population is very seasonal with 33-35,000 students enrolled in fall and winter sessions but only 11,000 in the spring term (May and June) and 7,300 in the summer term. The university contributes to nighttime travel even if the university is not the destination or origin. The students are dispersed throughout the city and make trips which are not directly university related. Although students live within or adjacent to main campus, there are key concentrations at the North Campus and at apartment complexes at the city's outskirts.

Finally, there are many janitors, security guards, waiters/waitresses and bartenders who work late hours. These might also be expected to be traveling to and from various points in the city with some concentrations downtown.

2.1.4 Issues of Crime and Safety

The impetus for Night Ride was concern over the number of assaults on and rapes of women. The concerns of residents and institutions over crime in Ann Arbor suggest that it is especially rampant. However, some local representatives have pointed out that the crime rate in Ann Arbor may not be atypical of communities of its size that have a similar character.

The presence of a large university makes it difficult to compare Ann Arbor to most other similar-sized communities. The student population is large, young, and transient. The activity level generated by the university makes Ann Arbor difficult to police, and the large number of young women provide an obvious target for sexual assaults. While the crime

rate in Ann Arbor might not approach the levels in some large cities, the perception of some of the student population that it is a safe, small town is possibly naive.

Whatever the actual crime rate, no one would argue that the community's concern over the assaults on women are unjustified. The feminist movement and local feminist groups have increased recognition of safety issues concerning women and the community has undergone a transition to awareness and concern.

Available statistics on rape and sexual assault are not very useful for evaluating trends. Most informed sources believe that these types of crimes have been chronically underreported, although the degree of reporting has increased substantially in recent years. Although Michigan law defines several degrees of sexual crime, they are not organized along the lines of interest to this study (specifically, identifying street assaults by strangers).

If one assumes that the likelihood of reporting of these crimes has increased in recent years, then the fact that reported incidents have not increased implies that the actual incidence of these crimes has decreased. Consequently, it appears that the initiation of Night Ride was due more to increased awareness and to a reaction to some individual incidents which shocked the community, than a steadily increasing number of assaults. In any event, women in Ann Arbor are fearful of assault and the community is committed to improving their safety.

In view of the questionable value of the available statistics, no attempt is made in this evaluation to compare the incidence of nighttime street assaults on women before and after the implementation of Night Ride. Instead, the perception of safety provided by Night Ride and the degree of Night Ride usage for the purpose of safety were chosen as evaluation measures.

Perhaps the other information useful to this evaluation is the extent to which other institutions responded to this perceived need for safe nighttime transportation. The pressure brought to bear on the AATA undoubtedly was also applied to other local institutions, many of which responded in ways which had an influence on Night Ride utilization.

The three primary institutions concerned with personal security at night are the University, the University Hospital and the City of Ann Arbor; each has made specific efforts in the past several years to improve safety for women, as discussed in the following sections.

The University

Although the three murders of women that took place in 1981 were not on campus, two of the victims were affiliated with the university. As a result, the university has faced increased concern about security. According to the university's off-campus housing office, the awareness and concern of the student body regarding safety has greatly increased over the past few years. Students frequently request better lighting, locked bathrooms, transportation, and security officers, unlike several years ago. A key concern raised by women in recent surveys of dormitory residents, has been safe travel at night. However, the university had been studying security problems long before these incidents and implemented a new security plan in 1970.

Because the main university campus is located in the city's downtown police district, the security problems of the campus and the downtown area are inseparable. Unlike many other universities (particularly in Michigan), the University of Michigan in Ann Arbor does not have a sworn campus police force but instead combines a 22-officer university security force with a contracted force of seven uniformed city police officers and two detectives. The regular security forces include mobile and foot patrols and operate 24 hours a day. In addition, a housing security force was added to patrol the dormitories at night. A private contracted guard force is also maintained at night to patrol campus buildings. Radio contact through the central office is used to coordinate the efforts of these separate forces, although the city police under contract to the university are based at the city police station.

The security office provides an escort service for emergency use; however, during the period immediately following the homicides, many callers requested escorts for non-emergency situations. If security is unable to provide an escort or if the call is clearly for non-emergency needs, callers are now referred to Night Ride. While some escort calls are not reported, the office keeps a record of escort activities; during January 1983, the records indicate that escorts were provided to 40 callers.

For the past three years, the university has made an effort to provide special parking areas for women using campus facilities at night. However, because of limited parking adjacent to major buildings, the number of spaces that can be provided is small. (Women are discouraged from using one parking structure located near downtown activity centers which is perceived as somewhat less safe.) The security forces have reported incidents in parking lots but these were primarily break-ins of automobiles and very rarely involved assault.

The University Hospital

Hospital security staff believe that the hospital is a prime target for sexual assaults because of the large number of female employees, many of whom work night shifts. Nevertheless, they characterize the situation as one of mostly fear with little actual crime. The last rape to take place in the hospital occurred 8 years ago, although one took place near the hospital 5 years ago. To raise awareness and promote self-defense measures, a rape prevention class is held once a month during lunch hour; this program has been in place for about 4 or 5 years.

Although the hospital is part of the university, it maintains a separate security force. Maintaining safe parking areas is an important aspect of hospital security, particularly when evening shift ends and night shift begins for nursing and some other staff members. (The hospital nursing staff comprises 950 of the 5,250 hospital employees; about 1,600 employees work the night shift on any given night.) Uniformed guards are provided 24 hours a day in the two parking structures operated by the hospital. They continuously patrol the areas and, together with other hospital guards, provide surveillance for women leaving the hospital at night. An escort service is also provided for both women and men who wish to have an escort to their parked car. Approximately 40 escorts are provided per night in the summer and twice that number in the winter. The escorts are provided from the front entrances of two buildings and the emergency room to any parked car; the escort will remain until the car has been started.

The hospital maintains more than 2,000 parking spaces for staff in parking structures plus many small and medium sized parking lots. At present, there is no priority parking for night-shift employees, although such a system was in place until the completion of the newest parking garage. It is believed that there is sufficient parking for all employees at this time, although at certain times of day staff may have to park one to two blocks away.

Parking stickers which entitle staff members to use staff lots cost \$100 per year. Carpoolers get a discounted sticker, but many evening shift staff members find carpooling difficult since coordinating departure times can be a problem. Night Ride may provide staff an alternative way to return home (i.e., a back-up) which may make carpooling more attractive.

Other security improvements undertaken in the past few years include improved lighting in the parking areas and an increase in the number of security officers. The safety issue surrounding parking is important enough to have been brought up in union negotiations. The hospital's position is that the

escort services, daytime (campus and hospital shuttle) buses and security forces are sufficient and that additional closer parking areas and increased patrols are unnecessary.

The City of Ann Arbor

The city has been dealing with issues of crime, and specifically assaults on women, through the police department and its Citizens Advisory Committee on Rape Prevention. The committee includes representatives of the university, Women's Crisis Center, and Assault Crisis Center. The committee was organized at about the same time as the AATA proposed its grant application for Night Ride, and one of its first official acts was to interact with the AATA on Night Ride. Among the objectives of the Citizens Advisory Committee are to:

1. develop and promote relevant legislation;
2. share information with other organizations; and
3. develop new safety programs.

Among its accomplishments are:

1. working with the police department to train all patrol officers to deal properly with victims of sexual assault;
2. purchasing films for inclusion in the police department's regular crime prevention series;
3. preparing booklets on rape prevention for inclusion in new students' orientation package; and
4. prepared maps and compiling statistics on the incidence of sexual assaults and their correlation with street lighting.

2.2 TRANSPORTATION CHARACTERISTICS

2.2.1 General

While major improvements in public transportation have occurred in Ann Arbor in the past decade, transportation in the city is still heavily oriented toward the automobile. As seen in Table 2-5, 89% of all households in 1980 had at least one automobile available and over 69% of all workers traveled to work by automobile. This is virtually the same percentage as was reported in 1970. The majority of these workers, almost 67%, had a place of work within Ann Arbor.

Ann Arbor has a complete expressway ring on its periphery, formed by Interstate 94 on the south and west, U.S. Route 23 on the east and State Highway 14 on the north. Nine major arterials connect the expressway ring with the central business

TABLE 2-5. JOURNEY TO WORK DATA

Number of Automobiles per Household (Percent)

0	10.6
1 or more	89.4

Total Number of Workers	53,919
-------------------------	--------

Mode to Work (Percent)

drive alone	54.0
carpool	15.0
bus	6.9*
walk	18.3
train	0.5
other	2.6
work at home	2.7

Place of Work (Percent)

within Ann Arbor	66.8
outside Ann Arbor	28.0
not reported	5.2

* This compares to 3.6% in the 1970 census (before the introduction of any dial-a-ride services).

Source: 1980 U.S. Census

district in a radial pattern (see Figure 2-1) The Huron River separates the northeast section of the city from the central business district and other residential areas and has constrained the amount of surface street capacity connecting these segments of the city. General traffic conditions in the city are good, with relatively uncongested flows even during peak hours.

Ann Arbor started construction of a system of bikeways after voters approved an \$800,000 bond issue in 1973. There are currently over 50 miles of bikeways, and another bond issue is to be considered in 1984.

Limited commuter rail service is provided by AMTRAK connecting Jackson and Detroit with stops at Ann Arbor and Ypsilanti. Amtrak also operates service in each direction between Chicago and Detroit with stops in Ann Arbor and other communities in southern Michigan. Regional bus service is provided by private carriers.

The Detroit Metropolitan Wayne County Airport is located between Detroit and Ann Arbor and is easily accessible via Interstate Route 94. This airport is served by bus and limousine from downtown Ann Arbor and the university.

Local bus service is provided by the AATA, the University of Michigan, Eastern Michigan University (in Ypsilanti), and the public school system. The AATA and University of Michigan bus services are described in Sections 2.2.3 and 2.2.4, respectively.

2.2.2 AATA Background

Like many other cities, Ann Arbor faced declining bus ridership after the Second World War. In the period between 1946 and 1954, annual bus ridership declined from 1.7 million to 700,000 while the city population grew from 40,000 to 55,000. By 1968 the last private bus company ceased operation, and for several weeks no buses were operated. It was at this time that the city assumed a role in providing transportation service.

From June 1968 to February 1969, the city contracted for bus service with a private firm, and in July 1968 the AATA was created by the city in accordance with state enabling legislation. The AATA operates autonomously of the city government; while the Mayor appoints the AATA Board members, it does not review the operating budget.

It was only after the private contractor failed to remain within the contract cost that the AATA initiated a municipal bus operation. Starting with four minibuses in 1969, it grew

to 18 vehicles in 1972, operating on six radial routes, 12 hours a day on weekdays, with free downtown transfers. Ridership in 1972 reached 540,000 passengers.

In 1971, the AATA (aided by State of Michigan demonstration funding) began experimenting with dial-a-ride service. The AATA later developed an integrated system known as Teltran, after a \$2.5 million "millage" property tax to fund it was approved by the voters in April 1973. Teltran offered 100% geographic coverage citywide and doorstep service via dial-a-ride with free transfers to fixed-route line buses. The dial-a-ride service operated within neighborhood zones that varied by time-of-day. By 1976, implementation of the Teltran system was completed and ridership was up to 1.6 million passengers. The deficit per passenger was \$1.66 of which 93¢ was covered by the millage tax. In 1975-1976, the productivity of the dial-a-ride service was 6 passengers per vehicle hour (including transfer passengers).

Although the Teltran system served to increase ridership, the AATA began a conversion process to restore fixed-route service in most areas and decrease the role of dial-a-ride. This was in response to increasing ridership, costs and deficits while productivity remained unchanged. By the time the Night Ride demonstration began, general public dial-a-ride service was limited to evenings and Sundays; although daytime dial-a-ride service remained intact for the elderly and the handicapped. A detailed description of AATA services at the time of the demonstration is provided in Section 2.2.3.

2.2.3 AATA Services

At the outset of the demonstration, the AATA operated fixed-route services from 6 a.m. to 6:45 p.m. on weekdays and from 7:45 a.m. to 6:45 p.m. on Saturdays, with service on only a few lines extending into later hours (see Table 2-6). During evening hours (6:45 p.m. - 11:15 p.m.) and on Sunday (9:00 a.m. - 6:00 p.m.) zone-based, doorstep dial-a-ride services were offered to the general public. A separate dial-a-ride service was operated for elderly and handicapped persons only. After 11 p.m., however, AATA offered no service (see Figure 2-4). When Night Ride was initiated in March 1982 to fill this gap, no other substantial service changes took place. Note that there was no AATA service on Saturday and Sunday evenings. Near the end of the demonstration, weekday evening dial-a-ride was eliminated by the extension of weekday fixed-route service until 10 p.m. and Night Ride was provided one hour earlier (on both weeknights and weekends).

Fixed-route service is operated within Ann Arbor and to and from neighboring Ypsilanti. Throughout the demonstration, fares were 60¢ and transfers were free. Tokens could be

TABLE 2-6. FIXED-ROUTE SERVICE

<u>Route</u>	<u>Direction</u>	Last Trip of the Day:	
		<u>Before</u> <u>Nov. 27, 1983</u>	<u>After</u> <u>Nov. 27, 1983</u>
1 Pontiac	Loop	6:15	9:45
2 Plymouth	Outbound	6:15	9:45
	Inbound	6:15	9:15
3 Huron River (to St. Joe's Only)	Outbound	6:15	9:45
	Inbound	6:15	10:15
4 Washtenaw	Outbound	6:15	9:45
	Inbound	6:00	9:30
5 Packard (to Meijer's Only)	Outbound	6:45*	9:15
	Inbound	6:15	9:15
6 State-Ellsworth	Outbound	10:45	10:45
	Inbound	10:15	10:15
7 S. Main-Huron Parkway	Outbound	6:15*	9:15
	Inbound	5:45	9:15
8a Liberty-Pauline	Loop	5:45	9:45
8b Pauline-Liberty	Loop	6:15	9:15
9 Jackson	Loop	6:15	9:45+
10 Ypsilanti-North	Loop	6:30*	7:00
11 Ypsilanti-South	Loop	6:30*	7:30+
12 Stadium-Miller (to Pioneer Only)	Outbound	6:15	9:45
	Inbound	6:00	9:15
13 Newport	Loop	6:15	9:15
14 Geddes	Loop	6:15*	9:45+
15 Maple	Loop	6:15*	9:15

* Currently not Complete Trip

+ Outbound Only

purchased in groups of 20 for 45¢ each. Dial-a-ride service was available in each of several zones covering the entire city (see Figure 2-5) and used the same fare structure. Free transfers between zones could be made at 4th Avenue and Liberty Street. Note that general public dial-a-ride differed in several ways from Night Ride:

1. Dial-a-ride operated in a zone basis requiring transfers for some trips, while Night Ride offered door-to-door service anywhere in the city.
2. Dial-a-ride used minibuses instead of sedans.
3. Dial-a-ride used AATA union labor unlike Night Ride.
4. Dial-a-ride fare was only about one-third that of Night Ride.

Students (during school hours), low-income residents, senior citizens and disabled people with AATA identification cards ride at half fare on fixed-route and dial-a-ride. Lift-equipped, door-to-door service was available in the city to the elderly and disabled on a 24-hour advance reservation basis at a cost of 30¢ (with an ID).

Ridership on AATA services has continued to grow in recent years as fixed-route services were expanded (except for one decrease in service in 1982 which was restored in 1983). (see Table 2-7). Ridership in FY 1982 was 2.84 million, up more than 50% since FY 1980. About 2.71 million (95%) of the riders in FY 1982 were fixed-route travelers. The fixed-route service accounted for 74% of the system's \$6.70 million annual budget.

In 1983, fixed-route services cost \$1.27 per passenger while general public dial-a-ride cost \$4.79 (operating cost excluding vehicle depreciation). Of course, AATA's most expensive service on a per passenger basis was the lift-equipped dial-a-ride at \$25.56.

2.2.4 University Bus Services

The university operates three separate free transit services for its students, faculty and staff members:

1. Commuter Bus
2. North Campus Bus
3. Nite Owl Bus

Altogether, the university bus services carry about 3.5 million passengers per year and have a total budget of \$900,000. They account for more passengers on an annual basis than the AATA services.

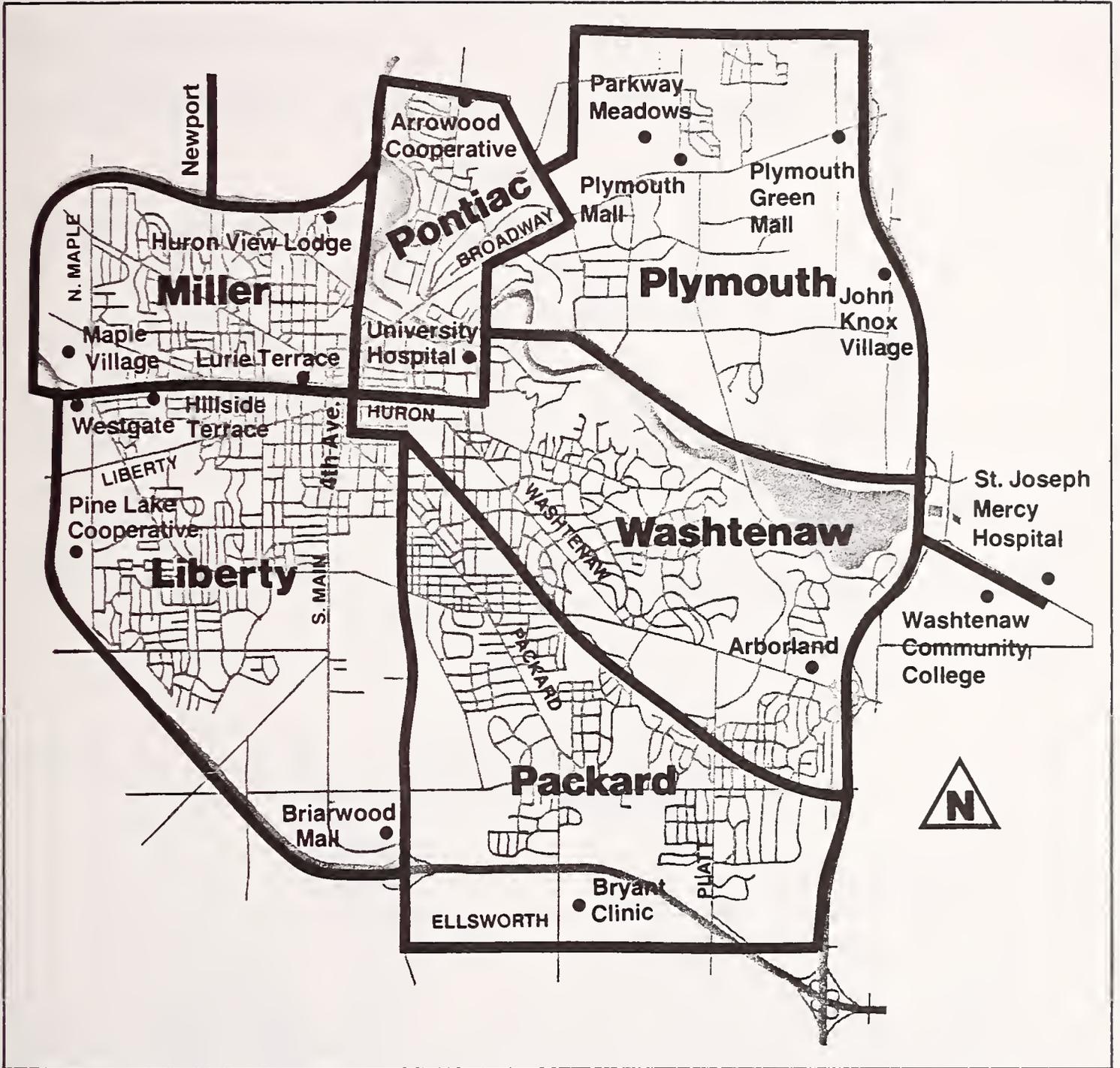


FIGURE 2-5. GENERAL PUBLIC DIAL-A-RIDE SERVICE AREAS

TABLE 2-7. AATA RIDERSHIP AND COST SUMMARY

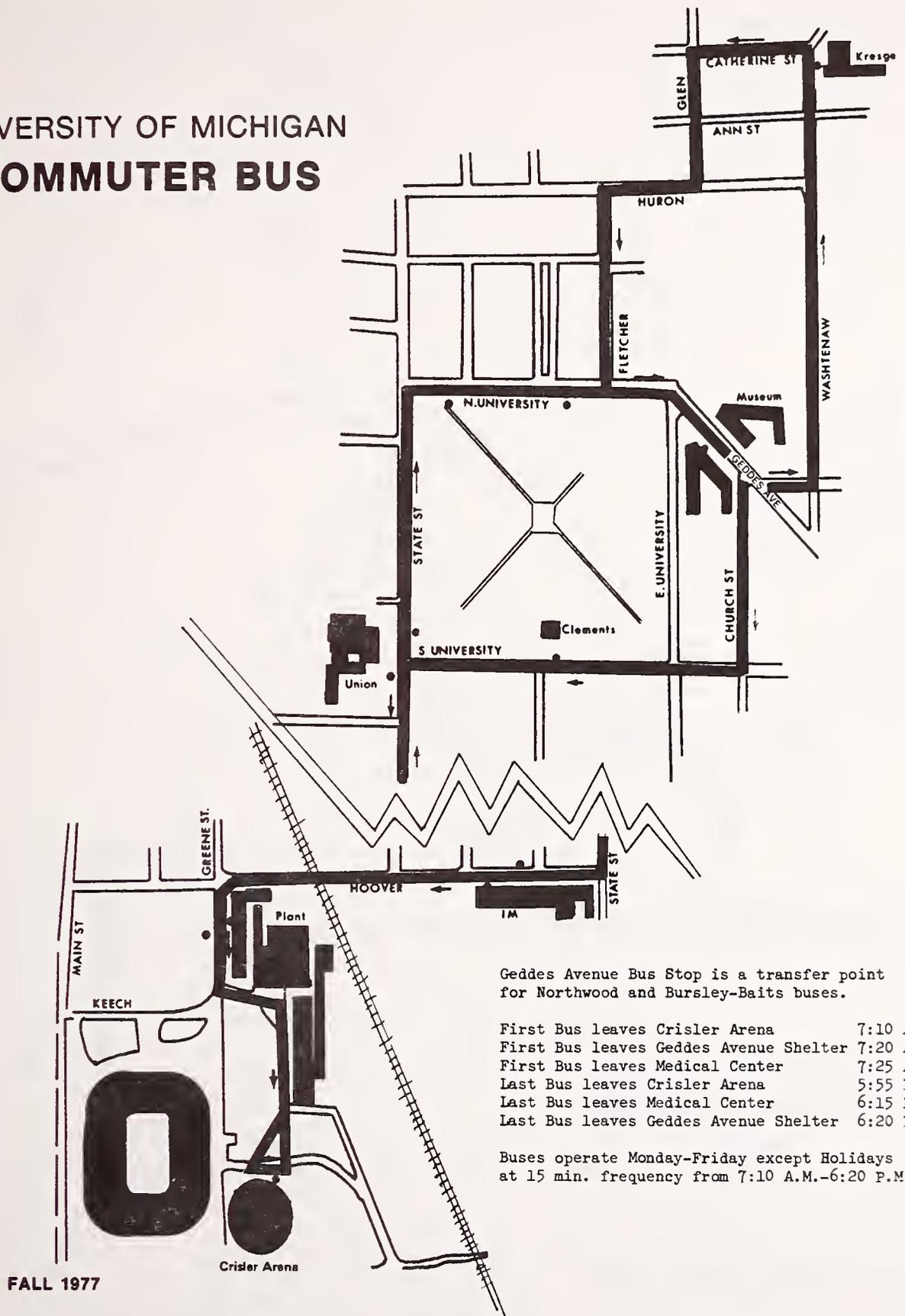
	<u>FY 1980</u>	<u>FY 1981</u>	<u>FY 1982</u>	<u>FY 1983</u>
<u>RIDERSHIP</u>				
Fixed-Route	1,677,438	2,397,178	2,707,860	2,892,665
General Public Dial-A-Ride			89,504	96,904
	204,080	169,225		
Elderly & Handicapped Dial-A-Ride			42,820	46,994
TOTAL	<u>1,881,518</u>	<u>2,556,403</u>	<u>2,840,184</u>	<u>3,036,563</u>
<u>TOTAL OPERATING COST</u>				
Fixed-Route	\$3,404,679	\$3,914,717	\$4,955,384	\$4,686,117
General Public Dial-A-Ride			536,129	498,087
	1,926,368	2,129,005		
Elderly & Handicapped Dial-A-Ride			1,206,668	1,201,166
TOTAL	<u>\$5,331,047</u>	<u>\$6,043,772</u>	<u>\$6,698,181</u>	<u>\$6,385,370</u>

Source: AATA

The Commuter Bus operates every 15 minutes from approximately 7 a.m. until 6:30 p.m., Monday through Friday. It provides connections between all main campus locations and the hospital complex, as well as service to the athletic fields (see Figure 2-6).

The North Campus Bus serves as a connecting service between the isolated north campus and the main campus, operating every 3 to 5 minutes in the daytime and every 30 minutes at night (or 60 minutes depending on the exact destination). (See Figure 2-7.) Although many students at the north campus have many of their classes there, most have some or all of their classes at the main campus. The North Campus bus operates from 7 a.m. to 2:15 a.m., seven days a week.

UNIVERSITY OF MICHIGAN COMMUTER BUS



Geddes Avenue Bus Stop is a transfer point for Northwood and Bursley-Baits buses.

First Bus leaves Crisler Arena	7:10 A.M.
First Bus leaves Geddes Avenue Shelter	7:20 A.M.
First Bus leaves Medical Center	7:25 A.M.
Last Bus leaves Crisler Arena	5:55 P.M.
Last Bus leaves Medical Center	6:15 P.M.
Last Bus leaves Geddes Avenue Shelter	6:20 P.M.

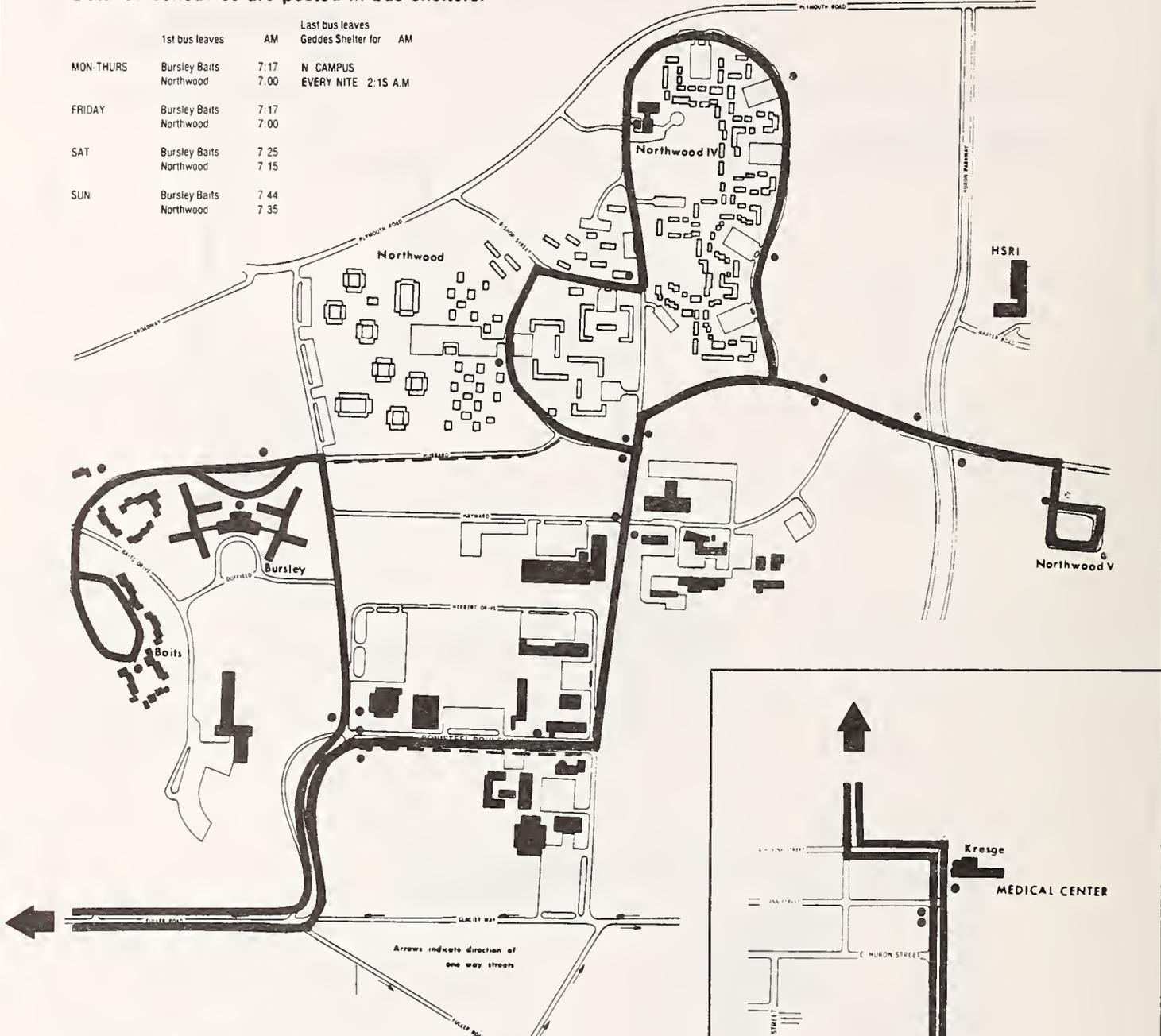
Buses operate Monday-Friday except Holidays at 15 min. frequency from 7:10 A.M.-6:20 P.M.

FALL 1977

FIGURE 2-6. UNIVERSITY OF MICHIGAN COMMUTER BUS

Detailed schedules are posted in bus shelters.

	1st bus leaves	AM	Last bus leaves	AM
MON-THURS	Bursley Bais	7:17	N CAMPUS EVERY NITE 2:15 A.M.	
	Northwood	7:00		
FRIDAY	Bursley Bais	7:17		
	Northwood	7:00		
SAT	Bursley Bais	7:25		
	Northwood	7:15		
SUN	Bursley Bais	7:44		
	Northwood	7:35		



UNIVERSITY OF MICHIGAN NORTH CAMPUS BUS

Weekends only. Routes are combined and service all bus stops shown on map.

FALL 1981

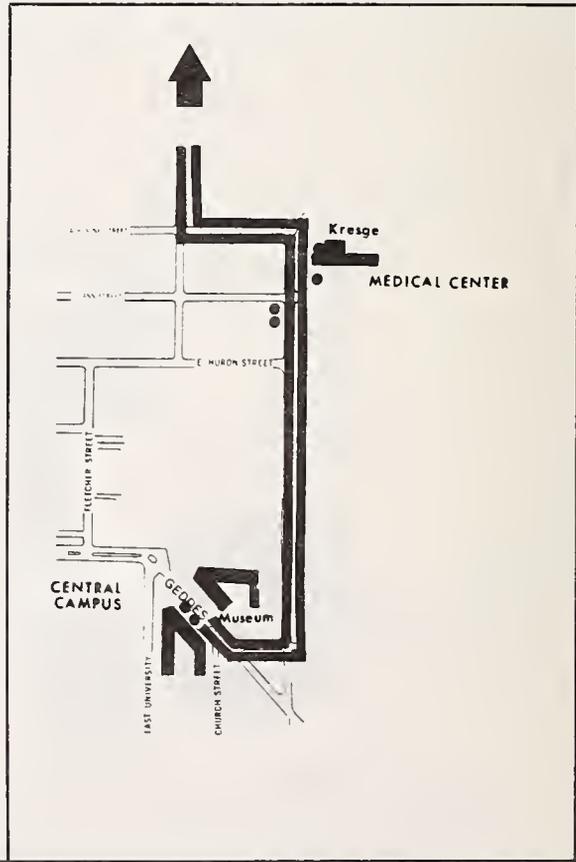


FIGURE 2-7. UNIVERSITY OF MICHIGAN NORTH CAMPUS BUS

The Nite Owl Bus has been operating for approximately eight years and was initiated after several murders took place in Ann Arbor. Women's and parents' groups were important in pressuring the university for this service. The Nite Owl operates every 30 minutes from 7 p.m. to 2 a.m., seven days a week, connecting main campus locations, the hospital and some nearby residential areas and fraternity/sorority houses (see Figure 2-8 and 2-9). It is primarily designed to meet safety and security needs. The ridership of approximately 25,000 per year is over 95% women. Nite Owl serves about 15 passengers per vehicle hour. The service costs the university \$31,000 per year, or about \$1.29 per passenger. Student drivers who are paid \$5.00 per hour with no benefits, keep the costs of the service low.

Although the service serves a number of dormitories and other campus residences, a large number of students live off-campus and would not make use of the Nite Owl but could use a citywide service like Night Ride. There have not been any recent requests to expand the Nite Owl service.

2.2.5 Taxi Services

Just before and during the demonstration, two taxi companies, Veterans Cab and Yellow Cab, operated in Ann Arbor, offering service 24 hours, seven days a week. Taxi rates were a \$1.00 drop charge plus \$1.10 per mile. For the average taxi ride of approximately 3 miles, the fare would be \$4.30. (The longest possible taxi trip in the city limits would cost about \$7.00.)

Before the improvements in Ann Arbor's bus service, which took place during the 1970's, taxi ridership was reportedly quite high on a per cab basis. In the 1970's, however, business dropped considerably and gasoline price increases threatened the economic viability of the taxi companies. In more recent years, the reduction in gasoline prices, the reduction in AATA Dial-a-Ride service and the AATA's willingness to contract with private operators for transportation services has helped the taxicab companies.

Before taxi regulatory revisions took place in August, 1982, the city limited the total number of cabs to 70 and required that taxi operations have a minimum of 5 cabs and operate for 24 hours a day. These regulations combined effectively to prevent new firms from entering the market. Fares and hours can now be set by the firms as long as they are filed with and accepted by the city. As a result, a few new cab companies have emerged with one to three vehicles, charging somewhat lower fares and operating less than 24 hours a day.

Veterans Cab, the operator of Night Ride, is a partnership that has been in business about 25 years. About five years before Night Ride was initiated, Veterans switched from commission to lease operation, for much the same reasons as

THE UNIVERSITY OF MICHIGAN NITE OWL BUS SERVICE

WHEN

BEGINS FALL 1981

HOW OFTEN

SEVEN DAYS A WEEK, FROM 7:00 P.M. to 2:00 A.M.
EXCLUDING THANKSGIVING WEEKEND OR
DURING VACATION PERIODS
EVERY 30 MINUTES ON THE HOUR AND HALF HOUR
LAST RUN BEGINS FROM THE UNDERGRADUATE LIBRARY AT 2:00 A.M.

FOR

STUDENTS, FACULTY, AND STAFF

WHERE

BEGINS FROM UNDERGRADUATE LIBRARY: RUNS COUNTERCLOCKWISE
★ INDICATES BUS STOPS



FIGURE 2-8. NITE OWL BUS SERVICE

THE UNIVERSITY OF MICHIGAN

To All University of Michigan Students

The U-M Nite Owl Bus Service described and outlined on the reverse side will again begin operations in the Fall 1980 in an effort to lessen your exposure in public areas to the risk of assault. There will also be additional U-M security cars patrolling the campus area after dark. **BE CAUTIOUS!**

Ultimately your personal safety lies in your hands. Your own conduct and concern can either secure or jeopardize your safety day or night. Follow these precautions that Safety Director Fred Davids suggests:

- If possible, travel in groups.
- Stay in lighted areas.
- If you are accosted, scream, run, kick, but above all, do not let the individual get you into an automobile or into a secluded area.
- Make sure you get the license number of the vehicle if there is a vehicle involved.
- If in your mind a situation arises which is questionable or suspicious, call the police immediately from the nearest phone. Do not wait until you get home or get to the place you are going. If possible, write down a description of the individual, including any outstanding characteristics, marks, or deformities.
- When you are walking on the streets at night, notify someone of the time you are leaving, and your expected arrival time at the place you are going, and with whom you will be.
- Be cautious when approached by complete strangers.
- Do not hitchhike at any time during the day or night.
- Do not accept rides with persons whom you know to be drug abusers or their associates.

Any questions concerning the U-M Nite Owl Bus Service should be directed to Transportation Services, 764-2485 or on weekends to Security, 763-1131.

FIGURE 2-9. NITE OWL BUS SERVICE NOTICE

other firms have done so: efficiency and cost considerations. At the time of the Night Ride demonstration, Veterans leased a total of 27 cabs and served an additional six independently owned cabs whose owners paid for dispatch and related services. During nighttime hours, 10 to 12 of these cabs are typically in operation. Veterans Cabs operate on propane gas rather than gasoline; the conversion, paid for by the propane company, has failed to yield savings due to the loss of the fuel tax rebate.

Veterans offers reduced fares (10% discount) to senior citizens and flat rate service for some long haul trips such as to the airport. (Trips to the Detroit airport cost \$25-30; Veterans cannot pick up passengers at the airport.) Veterans also operates contract services for the university (carrying medicine); the contract was awarded on a competitive basis.

Yellow Cab, the other major taxi company, owns 36 cabs, operating 12 to 15 cabs from 11 p.m. to 1 a.m. and 4 to 6 cabs for the rest of the night. Yellow Cab operates on a commission basis (with a few exceptions). Yellow Cab pursued contract service since the mid-seventies but never obtained a contract from the AATA. It does, however, provide handicapped transportation to university students under contract to the university; it began operating this service in the fall of 1983 using minibuses owned by the university. Yellow also won a contract towards the end of the demonstration for a city sponsored shared-ride user-side subsidy system for the elderly (see Section 3.3.4.)

While the taxicab company managers did not have information about their passengers, they suspected that low income residents, elderly residents, out-of-town visitors, hotel guests and some students used taxis; geographically, taxi business is generally concentrated in the central part of Ann Arbor.

Both taxi companies supplied nighttime ridership information to the AATA as part of their Night Ride bids. During the one week period of January 31 to February 6, 1982, 1,783 passengers were served by both operators combined. The total revenue of the two firms for nighttime service during the one week sample was \$7,587. During nighttime hours the number of cabs in service ranged from 7 to 33, with the busiest times before 1 a.m. or 2 a.m. and on weekends.

3. PLANNING, IMPLEMENTATION AND OPERATION

3.1 PLANNING

3.1.1 The Initial Proposal

A rise in the incidence of rape in Ann Arbor in 1980 was the impetus for the introduction of Night Ride service. The Public Interest Research Group in Michigan (PIRGIM) and several feminist organizations brought pressure on the AATA to deal with the transportation problems of women at night. PIRGIM's Women's Safety Task Force originally requested that the AATA operate all-night Dial-a-Ride service. The AATA agreed to study the situation but warned that dial-a-ride service could not be extended into late-night hours at reasonable cost levels. In addition, the AATA was still in the process of phasing out some of the dial-a-ride services that had been instituted in the 1970's as part of the Teltran system, a citywide integrated dial-a-ride and fixed-route bus service. It suggested that an alternative mode of operation would be necessary. The AATA considered a shared-ride taxi contract service and ride-sharing (e.g. carpools) among these alternatives. Against a backdrop of increasing use of private taxi companies across the country to provide lower cost demand-responsive transit, AATA chose this option to address the nighttime transportation problem.

The community was apparently very happy that the AATA had found a way to offer a nighttime service, and there was no opposition. It was quite clear that a full-fledged dial-a-ride service operated directly by the AATA would not be possible, and a taxi-operated service was viewed as the next best alternative by those favoring dial-a-ride.

3.1.2 Community Input

Although PIRGIM and several student and feminist organizations were instrumental in getting the AATA to consider a nighttime transportation service to deal with the problem of assaults against women, they played little or no role once the

idea moved into the planning and design stages. (They did however push unsuccessfully for initiation of service before demonstration funds could be obtained.) The AATA simply consulted the Women's Safety Task Force about its plans and obtained their support. Furthermore, while the beneficiaries of the service were perceived to include a large number of students and hospital employees, these organizations did not take an active role in planning or promoting the service, according to the AATA. Thus, AATA had a relatively free hand in the development of the concept.

3.1.3 Taxi Operator Reaction

The reaction of the taxi operators to the service concept was fairly positive from the start, although there was some variation over time and between the two taxi companies operating in Ann Arbor. Perhaps the reaction can best be understood in light of the changes that had taken place in transportation in Ann Arbor during the previous few years.

Taxi business had declined substantially with the growth of the transit service from a group of small subsidized fixed bus routes to an extensive system of door-to-door services. This had created an atmosphere of conflict between the public authority and the private taxi operators, who viewed door-to-door services as taxi turf. In the years just prior to implementation of Night Ride, however, the transit system underwent substantial changes. With the success of dial-a-ride service, the ridership and cost of providing the service grew, but productivity did not. Although the ridership included other groups as well as university students, the city and its taxpayers viewed the cost as excessive. Once ridership had developed, the AATA believed that extensive fixed-route service could be implemented and replace much of the dial-a-ride service which had been viewed as necessary for providing full coverage with low ridership. AATA's shift toward providing fixed-route bus service was welcomed in taxi circles, and consequently, the taxi operators were fairly receptive to a contract arrangement for Night Ride's door-to-door service, a relationship they had long hoped would come about.

Furthermore, cab operators had been encouraging contract assignments for nearly a decade but with little past success. The manager of Yellow Cab, for example, had proposed nighttime use of taxis under a contract arrangement in the mid-seventies.

3.1.4 Service Design

There were several design issues that were crucial in developing a feasible application of the shared-ride concept to

the problem of nighttime transportation. The important design considerations included the:

1. choice of a dedicated or integrated (i.e., with regular taxi service) fleet;
2. method of subsidy;
3. fare structure;
4. fare payment;
5. nature of operator productivity incentives.

Several criteria were established for the service design. Specifically, the AATA wanted to be assured that the service would be easy to implement, could be provided at a low and easily-budgeted cost, that many occasional users could be served, and that the AATA would not have to devote a great deal of time to supervising the service and its financial aspects.

An integrated fleet allows for more flexibility in operation and some efficiencies due to size of operation. On the other hand, integration raises concerns about dispatching priorities. The AATA chose to use dedicated vehicles to insure that vehicles would always be available for service and also to facilitate cost accounting.

While user-side subsidy arrangements offer maximum opportunities for participation by a wide range of private providers, they are less effective than provider-side subsidies in insuring that standards of service quality are met and in maximizing availability of service (especially for the occasional user).

A flat fare was selected as the easiest fare to implement, although it encourages longer trips and discourages shorter trips. However, since passengers making longer trips often get more circuitous rides, a flat fare may be a fair way to price service based on service quality. Although several fare levels were considered, and bids were obtained at three different fare levels (\$1.00, \$1.50, and \$2.00), the fare was finally set at \$1.50.

One of the important issues was how fare payment would be handled. Unlike many of the subsidized shared-ride services targeted at the elderly, Night Ride had to be available to any individual without advance preparation. Therefore, coupons, tickets and scrip were eliminated from consideration and only cash payment of fares remained as an option.

The AATA chose to purchase vehicle time rather than trips. This enabled the taxi company and the AATA to estimate the primary costs of the vehicle and driver as a fixed item. While this type of cost and subsidy arrangement removes some of the incentive for drivers to carry as many trips as possible,

other incentives were built into the cost structure. A related key issue was whether cash payments would be turned over to the authority or retained by the taxi operator. Having the operator keep the fares freed the AATA from ensuring proper fare handling and provided an incentive to the operator to dispatch rides effectively and to serve the maximum number of passengers with a given number of vehicles. The selection of the fare level, therefore, was not only designed to reflect a desired percentage of the exclusive taxi fare but also to provide a substantial incentive to the operator.

The taxi operators themselves helped to determine the ridership and the appropriate number of vehicles. The AATA decided to start small and allow for expansion since it was unsure of eventual demand. The number of vehicles was designed to correspond to declining demand over the course of the night. The limited flexibility provided for in the contract was an important aspect of the design. In fact, as the demonstration proceeded, the AATA allowed the operator increased flexibility to add a vehicle, as needed, to the base number of vehicles in the earliest time segment which occasionally experienced higher than normal demand.

3.2 IMPLEMENTATION

3.2.1 Obtaining Funding

Originally, the AATA looked to the New Technology Introduction program (UMTA Section 4(i)) for funding, but later was invited to apply for UMTA Section 6 (Demonstration Program) funding under the Service and Methods Demonstration Program. Although community interest groups were not involved in planning and designing the service, many provided letters of support for the grant application, including the University of Michigan's Vice President of Student Services; the AFSCME* Local, a U.S. Congressman, and PIRGIM.

The grant was approved in November 1981, providing \$78,200 towards the total estimated cost of \$89,000 for a one-year demonstration (see Table 3.1). Note that 100% funding was provided for all line items except operating expenses (i.e., the purchase of service contract).

3.2.2 Modifying City Taxi Ordinances

As is the case in most communities, taxi service in Ann Arbor is regulated by the city. Although the AATA initially expected that the taxi ordinance might have to be modified to

* American Federation of State, County, and Municipal Employees.

TABLE 3-1. UMTA DEMONSTRATION GRANT

	<u>Estimated Cost</u>	<u>UMTA Share</u>
Operations (Purchase of Service)	\$54,000	\$43,200 (80%)
Marketing	3,000	3,000
Monitoring & Education	1,000	1,000
Staff Time	10,000	10,000
Staff Travel	2,000	2,000
Data Collection	9,000	9,000
Contingency	10,000	10,000
	<u>\$89,000</u>	<u>\$78,200 (88%)</u>

accommodate shared-ride service, the extant ordinance proved to permit its operation. This was due to the ordinance's definitions of taxi and mass transit operation. Article I of Chapter 85 of the City Code specifies that "the term taxicab shall not include vehicles furnishing mass transportation service." In light of this, the entire ordinance was interpreted to exclude all AATA services from the entire ordinance. Incidentally, since the initiation of Night Ride, substantial taxi regulatory revision has taken place; a revised taxi ordinance went into effect in August 1982.

3.2.3 Obtaining an Operator

Once the grant was awarded in November 1981, the AATA was able to move ahead and obtain an operator. Because the AATA was concerned that the cab company that did not receive the contract might suffer a substantial loss of nighttime business, it offered the companies the opportunity to offer a joint bid. However, the two taxi companies were unable to reach an agreement. Therefore, the AATA went ahead and

prepared a request for bids, confident that both taxi companies would respond to the request. After receiving UMTA approval, the AATA advertised for bids on January 11, 1982.

The request for bids described the service as the AATA intended it to be operated. It did not solicit proposals from the taxi companies on how the service should be run. However, it left open the issue of fare by requesting bids for service at three fare levels, \$1.00, \$1.50 and \$2.00. The primary reason for leaving the fare undetermined was a concern of the board that there would be insufficient funds to provide a subsidy for one full year if the service operated at a low fare. Once the bids were received, the AATA could determine the fare which would permit the service to operate for the desired time period.

When the bids were received, Veterans Cab was the low bidder at all fare levels, with the greatest difference in subsidy per hour evident at the lowest fare level (see Table 3.2). The AATA awarded the contract to Veterans Cab in February at a subsidy of \$6 per hour and a fare of \$1.50.

TABLE 3-2. NIGHT RIDE BIDS

Subsidy Per Vehicle Hour:

<u>@ Fare of:</u>	<u>Difference Between Bids</u>	<u>Percent Difference</u>
\$1.00	\$4.50	64%
\$1.50	\$3.50	58%
\$2.00	\$3.00	55%

Veterans Cab chose to set Night Ride up as a separate business enterprise. All fares, as well as the AATA subsidy, are received as revenue by the business. The primary drivers are paid wages; additional drivers, who lease cabs from Veterans, receive discounts on their lease fees by driving Night Ride vehicles for a few hours per night, several days a week. (The discounts are not currently taxable as wages.) When Veterans cabs were in Night Ride service, a Night Ride logo sign was superimposed over the Veterans name.

The AATA drivers' union, the non-affiliated Transportation Employee's Union,* did not voice any objection to the contracting of Night Ride service to a private operator. The union, which was feminist and socially progressive or radical in nature, supported PIRGIM's goals and the general concept of Night Ride. According to the AATA, the union was realistic in understanding that the service could be much cheaper if provided through a taxi contract and not likely to be approved as an AATA, unionized operation.**

Although Night Ride represented a somewhat different type of service and was targeted at a special market, the AATA did not require or design any special training program relating to issues of safety and security or driver sensitivity to women's concerns about assaults. The AATA responded to problems on an ad hoc basis as necessary. In fact, one driver was removed from Night Ride service and talking to the drivers resolved other isolated problems.

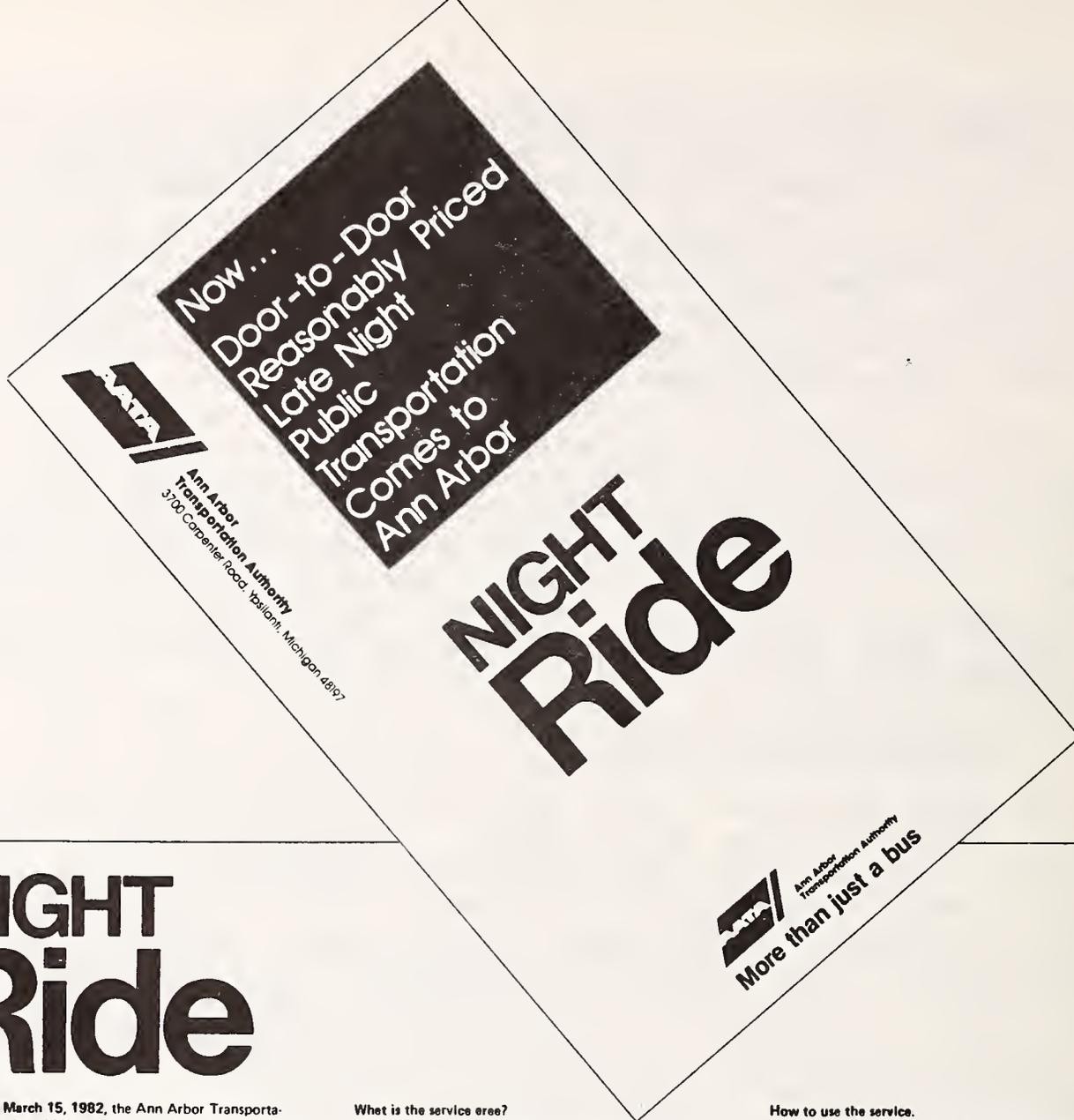
3.2.4 Marketing the Service

The AATA conducted some special marketing activities to generate ridership for Night Ride. A brochure and a flyer describing the service were prepared and distributed in a number of ways (see Figures 3-1 and 3-2). At the start of service in March 1982, the public was informed of the availability of this service via newspaper articles, newspaper advertisements, radio spot announcements, and radio talk show appearances. A member of the Women's Safety Task Force distributed brochures at the University Hospital.

It should be noted that the service was initiated at the end of the winter season and just before the close of the school semester. As a result, marketing initially received minor emphasis, with the intention of a second round of information dissemination in the fall when new students would arrive and weather conditions would be worsening. In September 1982, when the student population returned, brochures were included in a packet of information distributed to all students by PIRGIM. There was also a direct mailing to students from the AATA which included a coupon for a free Night Ride trip until December 31; only 387 coupons of the many thousands distributed were used.

* The union is now affiliated with the Transport Workers Union.

** Note that a typical (4th year) driver at the AATA earned \$10.08 per hour plus benefits in 1984, while the Veterans Cab taxi driver received a wage of about \$4-5 without any benefits.



NIGHT Ride

Beginning March 15, 1982, the Ann Arbor Transportation Authority will begin operating a late night shared-ride taxi service, Night Ride, in conjunction with the Veterans Cab Company. The AATA initiated Night Ride in response to the community need for safe, low cost, late night transportation for women, students, people who work night shifts, etc. Use of Night Ride will not be restricted to any particular group of commuters, but will be available on a demand basis to the general public. However, all Night Ride trips will be limited to the city of Ann Arbor only.

How will Night Ride operate?

Night Ride will provide door-to-door, shared transportation via taxi cabs, not AATA buses or vans. Just as with a regular taxi company, you'll simply call the special Night Ride telephone number - 663-3888 - to request that a cab pick you up at your present location. You won't need to wait at a bus stop or go outdoors until the cab arrives.

Unlike a standard taxi service, you'll pay a fixed fare of \$1.50, regardless of the distance you travel within the city limits. Because Night Ride will be operated as a shared ride service, the cab may pick up more than one passenger along its ride before dropping off each person at his or her destination. At other times you may enjoy a direct trip, depending upon demand for service that night.

What are the hours of operation?

Night Ride will operate between the hours of 11:00 pm and 6:00 am, seven nights a week. Pick-ups will not start before 11:00 pm and no orders will be taken after 5:30 am. Night Ride will complement AATA's daytime fixed route service and evening General Public Dial-A-Ride to provide virtually "round-the-clock", low cost public transportation within Ann Arbor.

What is the service area?

All trips on Night Ride must have their origin and destination within the city of Ann Arbor.



What is the fare for Night Ride?

All passengers will pay a fixed fare of \$1.50, regardless of the distance traveled within the city limits, or the time needed to complete the trip. Night Ride is being funded by a demonstration grant from the Urban Mass Transportation Administration and the AATA is subsidizing the Veterans Cab Company to operate the service. In this way the fare can be set at a fixed, reasonable rate allowing everyone to take advantage of this safe and convenient form of late night transportation.

How to use the service.

All Night Ride trips must be made by phone reservation only. Drivers are not permitted to pick up passengers who attempt to flag down a vehicle. To book a trip, simply call the special Night Ride service phone number - 663-3888. Give the dispatcher the following information: your present location, destination, and the time when you would like to arrive. The dispatcher will be able to give you an *approximate* pick-up time. Stay indoors until the specially marked Night Ride taxi arrives at your door.

Arrangements for Night Ride can be made on a call-in basis for up to twenty-four hours in advance. No standing orders will be accepted; however, passengers may phone in and arrange for Night Ride trips as often as they'd like.

For further information, call 663-3888



FIGURE 3-1. NIGHT RIDE BROCHURE

NIGHT Ride:

AATA's new
door-to-door,
late night
transportation
service.

Beginning March 15th, the Ann Arbor Transportation Authority will begin operating a late night shared-ride taxi service, Night Ride, in conjunction with the Veterans Cab Company. This service, which is being funded by a demonstration grant from the Urban Mass Transportation Administration, will provide low cost, door-to-door transportation between the hours of 11:00 pm and 6:00 am, seven nights a week. Night Ride will complement AATA's fixed route service and evening General Public Dial-A-Ride to provide virtually "round-the-clock", low cost public transportation within the city of Ann Arbor.

How will Night Ride work?

Night Ride service will be available on a demand basis to the general public. Trips must have both their **origin and destination** within the city of Ann Arbor. Transportation will be provided by specially marked Veterans cabs displaying the AATA Night Ride insignia. Passengers will receive door-to-door service and will pay a fixed fare of \$1.50, regardless of the distance traveled within the city limits. Because Night Ride will be operated as a shared ride service, the cab may pick up more than one passenger along its ride before dropping off each person at his or her destination.

How to arrange for a trip on Night Ride.

All Night Ride trips must be made by phone reservation only. Passengers will not be able to flag down Night Ride vehicles as they do taxis. Arrangements for Night Ride can be made on a call-in basis for up to twenty-four hours in advance by calling the special Night Ride service phone number — 663-3888. Pick-ups will not start before 11:00 pm and no orders will be taken after 5:30 am.

When making a reservation, give the dispatcher the following information: your present location, destination, and the time when you would like to arrive. The dispatcher will then be able to give you an *approximate* pick-up time.

More than just a bus

Night Ride
Late night shared-ride
11 pm — 6 am
\$1.50 fixed fare

For further information, call 663-3888



FIGURE 3-2. NIGHT RIDE AD

To some extent, the low level of marketing may have reflected the priorities of the AATA marketing department. However, the full \$3,000 earmarked in the budget for marketing the service was expended, and the AATA is not sure that ridership would have increased substantially with further marketing. The intention of Night Ride marketing was to inform potential users of the service, not to divert passengers from other modes. Nevertheless, Veterans Cab's owner believed that a "boost in advertising" was needed to increase ridership on Night Ride.

3.3 OPERATION

3.3.1 Fine-Tuning the Service Characteristics

AATA's plan was to start small, keep costs in control, and learn from experience how to adjust the service to meet demand. AATA was aware that it knew little about the demand for nighttime service or the degree to which trips could be shared. As a result, it was prepared to pay for a fixed number of service hours and track the development of ridership and productivity levels.

Service began on the first several days with only two vehicles operating during the early night hours (11 p.m. to 1 a.m.) and one vehicle after 1 a.m. and all night on Sundays, but a third vehicle was quickly added in the first two hours. At the same time, AATA recognized that four vehicles would occasionally be necessary, and added a fourth vehicle when required during the winter months when ridership was heavy. Thus, the base service was:

1. three vehicles from 11 p.m. to 1 a.m.;
2. two vehicles from 1 a.m. to 2 a.m.;
3. one vehicle for the remainder of the night;
4. a fourth vehicle was added as needed (by the taxi operator) during the first 2 hours of operation.

As the project progressed, the operator was allowed to add a vehicle if the AATA was notified immediately afterwards. The AATA allowed increasing discretion on the part of Veterans Cab after experience was gained with the service and a good relationship was developed with the contractor. The contract had been designed to safeguard against possible abuses. However, once extreme trustworthiness was demonstrated and AATA obtained a basis for assessing performance, some restrictions on service provisions could be relaxed to improve service flexibility.

The AATA built into the operator contract several terms that were important in its ability to supervise Night Ride and fine-tune the service characteristics. These included the following:

1. The AATA reserved the right to order a reduction (or termination) of Night Ride upon seven days notice (or a mutually agreeable shorter time period).
2. The AATA reserved the right to require additional dedicated vehicles, at a rate not exceeding the bid rate, upon seven days notice.
3. The AATA required the contractor to maintain records of: the time of calls for service; the origin and destination of the requested trip; the pick-up and drop-off times; the vehicle servicing each trip; the license number of the vehicles providing service for each period on a nightly basis; and the name of the drivers providing service on a nightly basis. These records would be in a format agreed upon by the parties and would be made available to the AATA.
4. The AATA reserved the right to install equipment to monitor phone and radio communications equipment. (It has never exercised this right.)

3.3.2 Community and University Relations

Once Night Ride service was implemented, there was little continuing interaction on the project with either university interests or community activist groups. PIRGIM, which had been the primary pressure group behind Night Ride, was pleased to see it implemented and turned its attention to other causes. AATA staff reported trying to enlist PIRGIM in its publicity and data collection efforts but to no avail. The university continued operating its nighttime bus services and security referred students to Night Ride who requested non-emergency escort services. The university housing office indicated that they were very happy to see Night Ride implemented but that a lot of feedback about the service they had received was negative, e.g., having to share a vehicle with intoxicated bar patrons. The hospital continued providing its security services. Some of its personnel office staff were found to be unaware that Night Ride was in operation, one year after start-up.

In general, it appears that the key community interest groups were satisfied with the service. Although, for the most part, word got around without a great deal of their participation, there may have been additional potential for disseminating information. However, since there were no surveys of the public at large, awareness levels cannot be assessed.

3.3.3 Renewing the Contract

The contract with the taxi operator, like the demonstration grant, was written to cover one year of operation. By March 1983, UMTA agreed to extend the project by six months to the end of AATA's fiscal year since the budget permitted. A renewal of the operator contract was set to take place and the taxi operator was requesting a modification in the terms. Specifically, the operator requested an increase in the hourly subsidy from \$6.00 to \$7.50, due to the fact that in its original bid it had overestimated the ridership on Night Ride and thus it was not receiving the revenue it had expected from the farebox.

Veterans Cab had bid the service at a \$6 per vehicle hour subsidy and an expected ridership productivity of 4.5 passengers per vehicle hour. Thus, its expected total revenue was \$12.75 per vehicle hour. (Note that this was expected to cover the cab company's operating cost per hour, plus some portion of its fixed costs.) Since ridership has averaged about 3.5 passengers per vehicle hour, revenues had been falling short by about \$1.50 per vehicle hour. Consequently, Veterans requested a \$1.50 increase in the vehicle hour subsidy to make up for the ridership shortfall. The AATA felt this increase was justified and calculated that the effect would be an increase in revenue of only about 2% over the original bid. Since Veterans had been operating the service for 1 year at the \$6 subsidy, the 6-month extension (until the expected end of the demonstration) at a slight increase was viewed as reasonable. UMTA concurred and the extension was granted at the higher rate. Note that with the increase Veterans was still operating at a subsidy lower than that bid by Yellow Cab.

3.3.4 Effect on City-Provided Elderly Transportation

Before 1981, the AATA operated its elderly and handicapped transportation as two separate services -- a lift service and a non-lift service. The non-lift service operated on a zone basis much like the general public evening and Sunday dial-a-ride. This costly service was used by senior citizens who for the most part were physically able to use fixed-route services. The merger of the lift and non-lift services enabled priority to be given to those individuals who could not use other AATA services, but effectively decreased service for senior citizens. After the merger of the elderly and handicapped services, the City of Ann Arbor expanded its senior center transportation program with community development block grant funding, but did not serve general purpose trips by senior citizens.

During the Night Ride demonstration service period, the AATA was approached by the City of Ann Arbor regarding additional transportation service for the elderly. The AATA

suggested that the city contract for the service with a taxi operator, as the AATA had done for Night Ride and provided information to assist the city in contracting for such service on its own. Note that the AATA could not subcontract for service for the elderly because its union contract allowed subcontracting for service only during hours when AATA service was not provided. (A subsequent contract negotiation has expanded the AATA's ability to contract for service.)

While the city's Senior Taxi service operates somewhat differently than Night Ride, the AATA's experience in establishing Night Ride opened the way for taxi operator participation in providing subsidized transportation for the elderly. Had the city been unable to set up a contract service, it might have requested that the AATA expand its specialized services, currently AATA's most costly operation on a per passenger basis. Interestingly, the provider for the elderly service selected by the city was Yellow Cab, the losing bidder on Night Ride.

3.4 POST-DEMONSTRATION ACTIVITIES

Due to the project's success, the AATA continued operating Night Ride with its own funds, beyond the demonstration period. Furthermore, for fiscal year 1984, the AATA decided to begin Night Ride service earlier in the evening in conjunction with extended fixed-route service hours, in order to enable evening dial-a-ride service for the general public to be eliminated. (This leaves only Sunday dial-a-ride service as a remnant of the Teltran integrated dial-a-ride service concept.) Operation of Night Ride beginning at 10 p.m. rather than 11 p.m. started November 27, 1983, using three to four vehicles (out of a maximum of five permitted by the contract). Fixed-route service was extended until 10 p.m. (in some cases, a little later to serve late classes at the community college). Table 3-3 outlines the expected cost of this service change; note that the cost would increase by \$156,000 per year but that additional ridership was expected.

Before implementing the service change, the AATA conducted a survey of evening dial-a-ride users (see Table 3-4). Many were very supportive of replacement with fixed-route buses and indications were that ridership might increase: 47% of survey respondents said they would be more likely to use fixed-route buses while 15% said they would be less likely. The survey did not, however, make clear the exact nature of the proposed service change.

The new evening service approach was to increase rather than decrease the costs of evening service; however dial-a-ride service was reportedly operating at capacity in many areas of the city and would otherwise have had to be expanded to handle

TABLE 3-3. COST OF POST-DEMONSTRATION SERVICE CHANGES

	<u>Vehicle Hours/Day</u>	<u>Annual Cost²</u>
Extended Fixed-Route Service (Ann Arbor Only)	40	\$408,000
Extended Night Ride Service ¹	<u>6</u>	<u>\$23,000</u>
	46	\$431,000
Elimination of Evening Dial-A-Ride (General Public)	<u>(27)</u>	<u>(\$275,000)</u>
Net Cost	19	\$156,000

1 The above cost estimate was prepared by the AATA assuming Night Ride hours would be extended only on weekday nights; in fact, an extra service hour was added every night of the week.

2 The annual costs are total operating costs rather than net costs (after revenues); because of Night Ride's higher fare, its revenues cover a much larger percentage of its total cost.

Source: AATA

demand. Despite the cost increase of the new service, it was believed that additional passengers would be served and passenger satisfaction with AATA services would increase. Extended service hours for fixed-route service had been a request in passenger and resident surveys; 65% of respondents to a 1981 telephone survey of residents said expanded service hours was important. Over 50% of AATA passengers rated AATA service poorly in this respect.

In the first month of the modified service, total number of passengers served on fixed-route plus Night Ride during the old dial-a-ride service hours exceeded the previous dial-a-ride ridership by over 100%. During the hour between 10 p.m. and 11 p.m. when Night Ride replaced dial-a-ride, ridership after the service change decreased. While dial-a-ride had served about 60-65 riders, Night Ride served about 13 (in the first two weeks of December). Night Ride productivity during the hour between 10 p.m. and 11 p.m. was about the same as for the previous month overall. Night Ride ridership in the month of December was 2,339, about 1,000 more than the previous December, and this level of ridership was sustained throughout the winter months. Despite the ridership growth, system

TABLE 3-4. SURVEY OF EVENING DIAL-A-RIDE PASSENGERS (August 1983)

TOTAL NUMBER OF SURVEY RESPONSES: 162

TRIP PURPOSE

<u>25%</u> Work	<u>12%</u> Shopping	<u>6%</u> School	<u>21%</u> Recreation	<u>36%</u> Other
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TRIP FREQUENCY

<u>27%</u> Daily	<u>37%</u> Several Times Per Week	<u>20%</u> Several Times Per Month	<u>16%</u> Less than 5 Per Month
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AGE

<u>25%</u> 18 or Younger	<u>28%</u> 19-24	<u>31%</u> 25-40	<u>9%</u> 41-59	<u>7%</u> 60 or Older
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SEX

<u>43%</u> Male	<u>57%</u> Female
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IMPORTANCE OF ISSUES RELATED TO PROPOSED CHANGE FROM EVENING DIAL-A-RIDE TO EVENING FIXED-ROUTE

	<u>Important</u>	<u>Somewhat Important</u>	<u>Not Important</u>
A. Fixed-Route Service Can Carry More People	48%	32%	20%
B. Fixed-Route Service Has More Predictable Schedules and Routes	66%	22%	12%
c. Dial-A-Ride Service Takes You to Your Door	74%	17%	8%

WOULD . . . (EXTENDING REGULAR FIXED-ROUTE BUS SERVICE LATER INTO THE EVENING TO REPLACE EVENING GENERAL PUBLIC DIAL-A-RIDE) . . . MAKE YOU MORE OR LESS LIKELY TO USE AATA EVENING SERVICE?

<u>47%</u> More Likely	<u>15%</u> Less Likely	<u>38%</u> No Difference
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COMMENTS

<u>43%</u> Positive	<u>23%</u> Negative	<u>34%</u> No Difference
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Source: AATA

productivity has remained at about 4 passengers per vehicle hour. As a result of efforts to keep response times down, ride times have increased and complaints have begun to occur on a regular basis (about 3 per month).

At the close of the demonstration, the AATA began adding some additional flexibility to the service design to improve wait times. The operator has been allowed to add and remove cabs from Night Ride service to meet demand. The AATA recognized that periods of high and low demand which occur on an occasional basis merit some immediate response in terms of operating fleet size. It was only after developing confidence in the operator that AATA permitted this flexibility. Monitoring of vehicle hours by the AATA has shown no abuse and that vehicle hours vary in direct relation to passengers served. In January 1984, the number of vehicle hours per night varied from a low of 16 to a high of 25. Although the operator can reduce or increase vehicle hours, the tendency is not to reduce hours since there is usually no use for the taxis in exclusive ride service during those periods of low demand. Thus, the AATA's specified service level has become more of a minimum service guideline. While flexibility subjects the budget to potential cost overruns the problem of high demand has been very seasonal in nature.

Another improvement to Night Ride under consideration but not yet implemented at the close of the demonstration was making Night Ride service accessible to the handicapped. The FY 1984 contract with Veterans Cab required cooperation with AATA on developing proposals for accessibility.

4. SERVICE QUALITY

This chapter covers a number of issues related to the quality of the service provided by Night Ride. These issues include both the spatial and temporal coverage of service, trip time and speed, service reliability, passenger safety and security, and, finally, passenger reactions to sharing a taxi.

4.1 SPATIAL AND TEMPORAL COVERAGE

In accordance with the city funding mechanism, Night Ride serves all locations within the city limits of Ann Arbor. Service was originally provided from 11 p.m. until 6 a.m. -- the hours during which no other AATA service for the general public was available. Most fixed-route service terminated at 6:45 p.m. on weekdays, and evening dial-a-ride service covered the period until 11 p.m. (At the end of the demonstration, AATA decided to eliminate evening dial-a-ride by extending fixed-route service until 10 p.m. and starting Night Ride at that time.) On weekends and holidays, a gap remained between the end of daytime service and the start of Night Ride (see Figure 2-4).

Before the demonstration started, the only transportation service available to the general public during Night Ride's hours was exclusive-ride taxi service. As described in Section 2.2, there were some services for special markets operating during some late-night hours (e.g., the university and hospital shuttle buses and escort services). While all of these special services continued to operate after Night Ride was initiated, Night Ride served the general public.

4.2 OVERALL TRAVEL SPEED

Night Ride travel speeds can vary greatly depending on the number and location of drop-offs and new pick-ups that are assigned to the vehicle and the driver's ability to organize his/her route efficiently. Consequently, some riders can

experience very quick service while others suffer very long and circuitous tours despite the relatively small size of the service area.

Table 4-1 shows some statistics on ride times derived from dispatcher logs during three selected periods of time. Note that the average, standard deviation and maximum ride time have been relatively consistent and that ride time appears to be quite variable within any given observation period. While the average ride time of just under 20 minutes is not extremely long, the maximum ride times do indicate some exceptionally long rides for a city the size of Ann Arbor (the longest straight-line distance in the city being approximately 6 miles).

TABLE 4-1. RIDE TIME STATISTICS

	Average (Min.)	Std Dev. (Min.)	Median (50% tile) (Min.)	95%-tile (Min.)	No. of Observations
February 1983	18.0	12.8	15	42	599
November 1983	19.6	14.6	15	47	606
December 1983	19.5	14.0	16	69	586

4.3 SERVICE RELIABILITY

4.3.1 Pick-up Time Reliability

The pick-up time or wait time the passenger experiences is defined as the delay between the expected and actual pick-up time. (While some individuals request immediate service, others call in advance and specify a desired pick-up time. If the dispatcher realizes that the desired pick-up time is impossible, then he advises the passenger of the expected pick-up time.) Table 4-2 indicates the distribution of wait times during the first eight weeks of the demonstration. While the majority of passengers experienced wait times under 20 minutes, there were substantial numbers who experienced long wait times (e.g., over one hour). For example, averaging over the eight weeks, 11% experienced wait times over 40 minutes. The week with an especially high percentage of long waits occurred during a period of exceptionally bad weather. As Figure 4-1 shows, average wait times have varied over the remainder of the project and there has been no noticeable improvement over the long term.

TABLE 4-2. WAIT TIME DISTRIBUTION (First 8 Weeks)

<u>Week Of:</u>	<u>0-19 min.</u>	<u>20-39 min.</u>	<u>40+ min.</u>	<u>Average</u> (Min.)	<u>Median</u> (Min.)
Mar. 15	71%	16%	13%	19.3	12
22	73%	23%	4%	17.4	15
29	67%	23%	7%	15.4	13
Apr. 5	57%	12%	32%	27.4	17
11	70%	25%	5%	15.1	10
18	64%	25%	11%	18.1	13
25	62%	28%	10%	18.7	17
May 2	57%	36%	7%	18.2	15
AVERAGE WEEK	65%	24%	11%	18.7	14

Source: AATA

Dispatcher logs from February 1983 (the same time a mailback survey was distributed to the riders), as well as, from November and December 1983 show an average response time of 23-25 minutes (see Table 4-3). The response time was found to be about twice the ride time, on average. The logs also show some rather long wait times, up to one hour excluding the worst 5%. Figure 4-2 shows the distribution of wait times during the November 1983 observation period. Note that about one-half of the sample waited less than 20 minutes.

As might be expected, wait time was a frequent passenger complaint in the mailback survey; 27% of respondents expressed the need for shorter wait times and another 8% for more vehicles (presumably for the same ultimate reason). Although wait time received the lowest rating, of the service quality characteristics included in questions in the mailback survey, half of the sample indicated that the wait time characteristics were "good" or "very good." (Rating choices also included "poor", "very poor" and "average"). This is a surprisingly high rating given some of the wait times figures noted above. Recall, however, that about half of the users waited 20 minutes or less in November 1983, which may not be much longer than the wait for regular taxis.

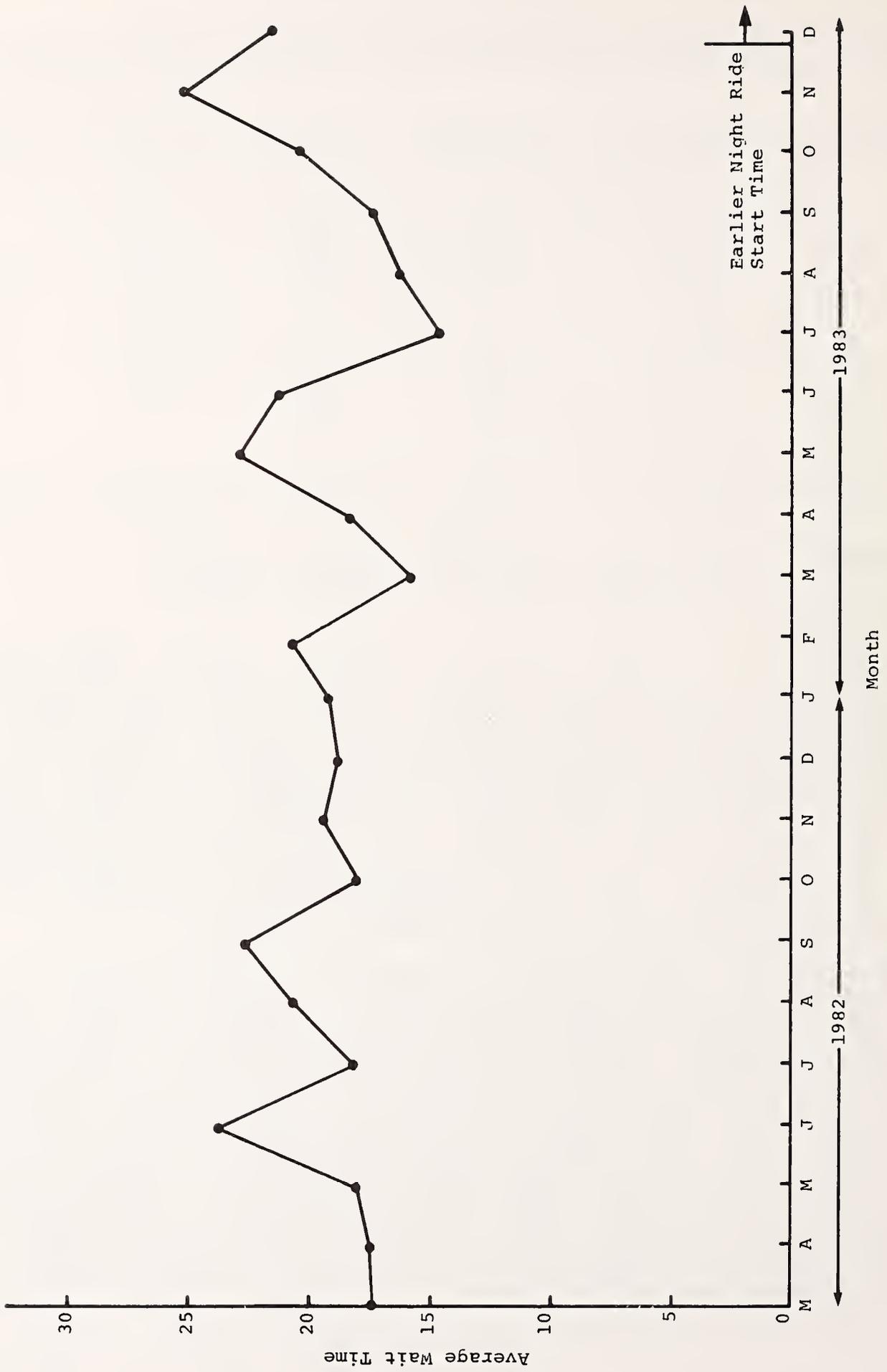


FIGURE 4-1. MONTHLY AVERAGE WAIT TIME

TABLE 4-3. WAIT TIME STATISTICS (Later Observations from Dispatcher Logs)

Sample From:	0-19			20-39		40+		Average* (Min.)	Standard Deviations (Min.)	Median 50%-tile (Min.)	95%-tile (Min.)	No. of Observations	% Early	Average Earliness (Min.)	Average Ratio Wait/Ride
	Min.			Min.		Min.									
Feb. 1983	50%			34%			16%	23.8	19.5	20	62	722	3.0%	7.1	1.91
Nov. 1983	46%			36%			18%	24.7	18.2	21	59	690	2.8%	6.7	2.31
Dec. 1983	51%			32%			17%	23.1	18.9	19	60	670	4.0%	7.3	2.08

* Early arrivals are treated as on-time.

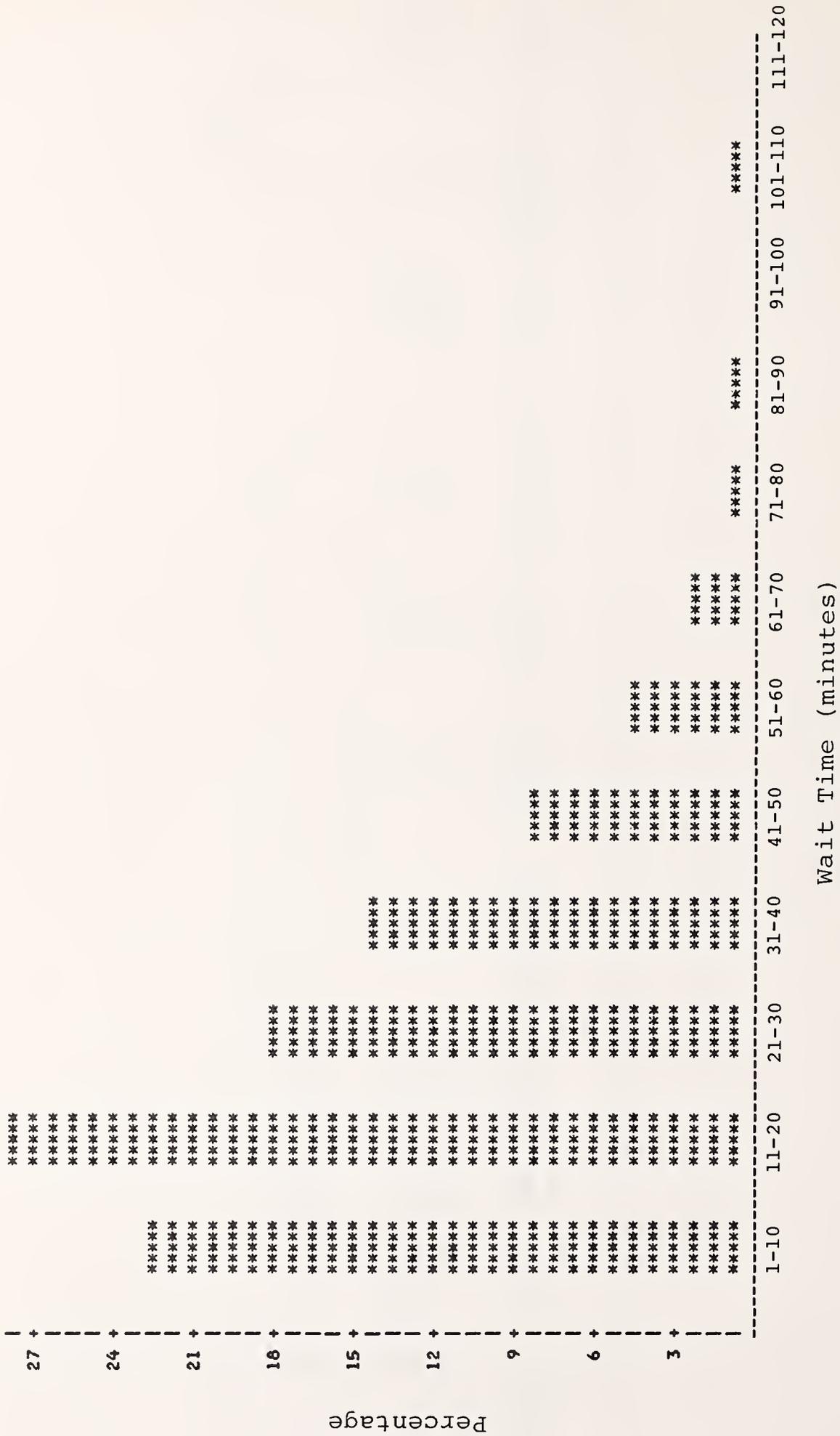


FIGURE 4-2. WAIT TIME DISTRIBUTION (November 1-14, 1983)

In-vehicle interviews, conducted in April 1983, indicated that 73% of the respondents were picked up "on-time", 15% "late" and 13% "early" (each respondent defining these terms individually). The late pick-ups ranged from 10 to 60 minutes behind schedule, with an average of 28 minutes. Advance call-in did not appear to improve the reliability of the vehicle arriving on time. Thirty-eight percent of respondents had called for service more than one hour in advance of the desired departure time. About 10% called for immediate service (only five minutes or less in advance).

4.3.2 Denials and Cancellations

February 1983 dispatcher logs showed that 14% of trip requests were not served. The majority of these (11% of all requests) were no-shows, while others were passenger cancellations. (The dispatcher indicated that the number of cancellations in the logs may not be completely accurate.)

Pick-up lateness undoubtedly was a factor in both cancellations and no-shows. However, the average response time for those trips which proved to be no-shows was the same as for all trips. While many passengers responding to a survey indicated that wait time was a problem, only one noted a complete failure to respond to a call. Earliness can also be a problem for the passenger; about 3% of pick-ups during the February log period were early, with the maximum earliness being 21 minutes.

A review of dispatcher logs 9 months later, in November 1983, showed improvement; 8% of the trip requests were not served, and 0.3% were no-shows. The large reduction in no-shows may have been due to a new policy implemented in the fall of 1983, in order to improve perceived reliability and reduce vehicle wait time and no-shows: the dispatcher began arranging to call Night Ride passengers (at university dormitories, in particular) to let them know the vehicle was on the way. Thus, passengers would not fear that they failed to hear the vehicle arrive and that it had already left, and the vehicle would find most passengers ready to go. Furthermore, this arrangement allows the waiting passengers to continue with their activity until the phone call, thus reducing the onerousness of wait time. Although not reflected in the wait time statistics, this may have been a contributing factor to reductions in the number of no-shows and cancellations.

4.4 SAFETY

The primary reason for instituting Night Ride Service was to provide a safer means of transportation at night. A key measure of the project's success is therefore the degree to which Night Ride is perceived as safe and to which it is used for safety reasons.

One interesting problem that arose in providing a public shared-ride service was the additional risk to which the passengers felt exposed because of the service. For instance, some women were unhappy with the service because they had to share a vehicle with male strangers. Furthermore, if they were dropped off first or picked-up later, their residential addresses were revealed to other riders. Thus, despite the desire to create a safe means of transportation, some users and potential users saw safety problems inherent in the service design.

In spite of the above, there were users who travelled on Night Ride specifically for safety reasons, but the percentage of respondents to user surveys who indicated "safety" as the primary reason for using Night Ride was smaller than originally expected. This percentage was very small in the in-vehicle user interviews (see Table 4-4), but it is believed that the presence of others in the vehicle during the personal interviews influenced responses to this question.

4.5 FARE

Night Ride was offered at a flat fare of \$1.50. Although this was almost three times the regular dial-a-ride fare (for

Table 4-4. SAFETY AS THE PRIMARY REASON FOR USING NIGHT-RIDE

<u>Survey</u>	<u>Sample Size</u>	<u>Percent of Respondents</u>
<u>Pre-Implementation:</u>		
Hospital Worker Survey	102	62%
University Student Survey:		
General	999	36%
Facility	943	41%
Evening Dial-a-Ride User Survey	48	32%
<u>Post-Implementation:</u>		
University Student Follow-Up	488	60%
Mailback User Survey	52	33%
In-vehicle User Interviews	66	7%

evening and weekend service), it compared favorably with exclusive-ride taxi fares. Taxi fares were \$1.10 per mile plus a \$1.00 drop charge. For a trip of 3 miles (the average trip length in the city) the taxi fare would be \$4.30 or almost three-times the Night Ride fare.

Because Night Ride's fare was not distance-based, it offered an especially good bargain for longer trips. The longest direct trip in the city is estimated to be about 6 miles; by exclusive ride taxi this trip would cost \$6 more than Night Ride or five times the Night Ride fare. Many passengers reportedly took advantage of Night Ride for long trips.

4.6 GENERAL PERCEPTIONS

Respondents to the user mailback survey were asked to rate several aspects of service quality including courtesy of drivers, vehicle comfort, wait time and overall quality. On average, overall quality was rated "good," with 77% of respondents indicating ratings of "good" or "very good." Driver courtesy received even better ratings with 86% indicating "good" or "very good." The average respondent rated vehicle comfort "good to average" and wait time "poor to average" (see Table 4-5).

Table 4-5. RATINGS OF SERVICE QUALITY (USER MAILBACK SURVEY)

	<u>Average Rating*</u>	<u>% Good or Very Good</u>
Courtesy	1.64	86%
Vehicle Comfort	2.17	67%
Wait Time	2.77	50%
Overall Quality	1.98	77%

* The rating scale was:

- 1 = very good
- 2 = good
- 3 = average
- 4 = poor
- 5 = very poor

5. RIDERSHIP AND TRAVEL BEHAVIOR

This chapter describes the users of Night Ride and their travel behavior. The first section examines the number of riders attracted to the service and the distribution of their trips over time. The second section profiles the socio-economic characteristics of the riders. Finally, the third section looks at trip patterns and mode choice issues, including non-users' decisions not to ride.

5.1 DATA USED IN THE ANALYSIS OF TRAVEL BEHAVIOR

Data for evaluation of travel behavior issues were derived from both dispatcher logs and surveys of potential and actual users. Logs were kept throughout the demonstration and monthly totals provided an overview of ridership issues. More detailed analysis of trip characteristics was performed using data from three two-week periods: February 1-13, November 1-14, and December 1-14, 1983.* Surveys included pre-implementation surveys of university students (including a general survey and a survey administered at nighttime facilities), hospital employees and evening dial-a-ride passengers; a follow-up panel survey of university students, and mailback surveys and in-vehicle interviews of Night Ride passengers. The reader is referred to Section 1.6 and the appendix for more detailed descriptions of these surveys.

5.2 RIDERSHIP

5.2.1 Total Ridership and Ridership Growth

Ridership on Night Ride increased substantially over the 22 months of monitored operation from March 1982 to December

* Actually data for some days, particularly in December, had to be omitted because it was incomplete.

1983. The final monthly ridership of 2,339 was the highest of any month in the demonstration. Of course, in December, Night Ride started one hour earlier than during the rest of the demonstration period. Before the service expansion, the highest ridership occurred in October 1983, when 1,600 passengers were carried and average productivity for the month reached its highest level, 4.2 passengers per vehicle-hour. The October 1983 ridership was 26% greater than that one year earlier.

The December 1983 ridership averages 76 passengers per night. Note that before Night Ride was implemented, AATA had roughly estimated a ridership of 70-107 passengers per night, 15 vehicle hours of service per night and a likely fare of \$1.00.

Ridership growth fluctuated over the demonstration period due to seasonal influences including weather and school schedules. (Figure 5-1 shows the growth in ridership over the period.) A time-series regression model was developed to distinguish between the seasonal effects and growth trends. The rate of growth in ridership was found to be 20 passengers per month in the best linear regression model, which incorporated variables for "number of months since the demonstration began" and a "dummy variable" indicating whether school was in session; it obtained an R-square of .64.

5.2.2 Seasonal Use

As expected, ridership was highest in the winter months, when subfreezing temperatures and snow are most likely to discourage walking (and, for some, driving) and to incapacitate vehicles. Ridership was higher in the winter of 1982-1983 than in either the previous or the following summers. Since the demonstration period included only one winter, and ridership grew over the entire demonstration, it is difficult to separate out seasonal effects. Furthermore, there are at least two seasonal effects tending to increase winter time ridership: 1) the effect of snow and cold weather in the November - March period and, 2) the effects of school sessions in the September - May period. As a counter effect, there may be a tendency to increase evening activities during the months when daylight continues until 9 or 10 p.m., although the direct impact of this factor on travel after 11 p.m. is not clear. Safety issues may also be linked to the seasons. For example, during cold weather there are less people on the streets at night suggesting less safety; however, the incidence of rape outdoors in cold, snowy weather is lower according to Ann Arbor police. It is not clear how perceptions of safety vary with the seasons.

Results of a regression model used to examine seasonal effects indicated that "school month" was a strong predictor of ridership along with "number of months since the demonstration

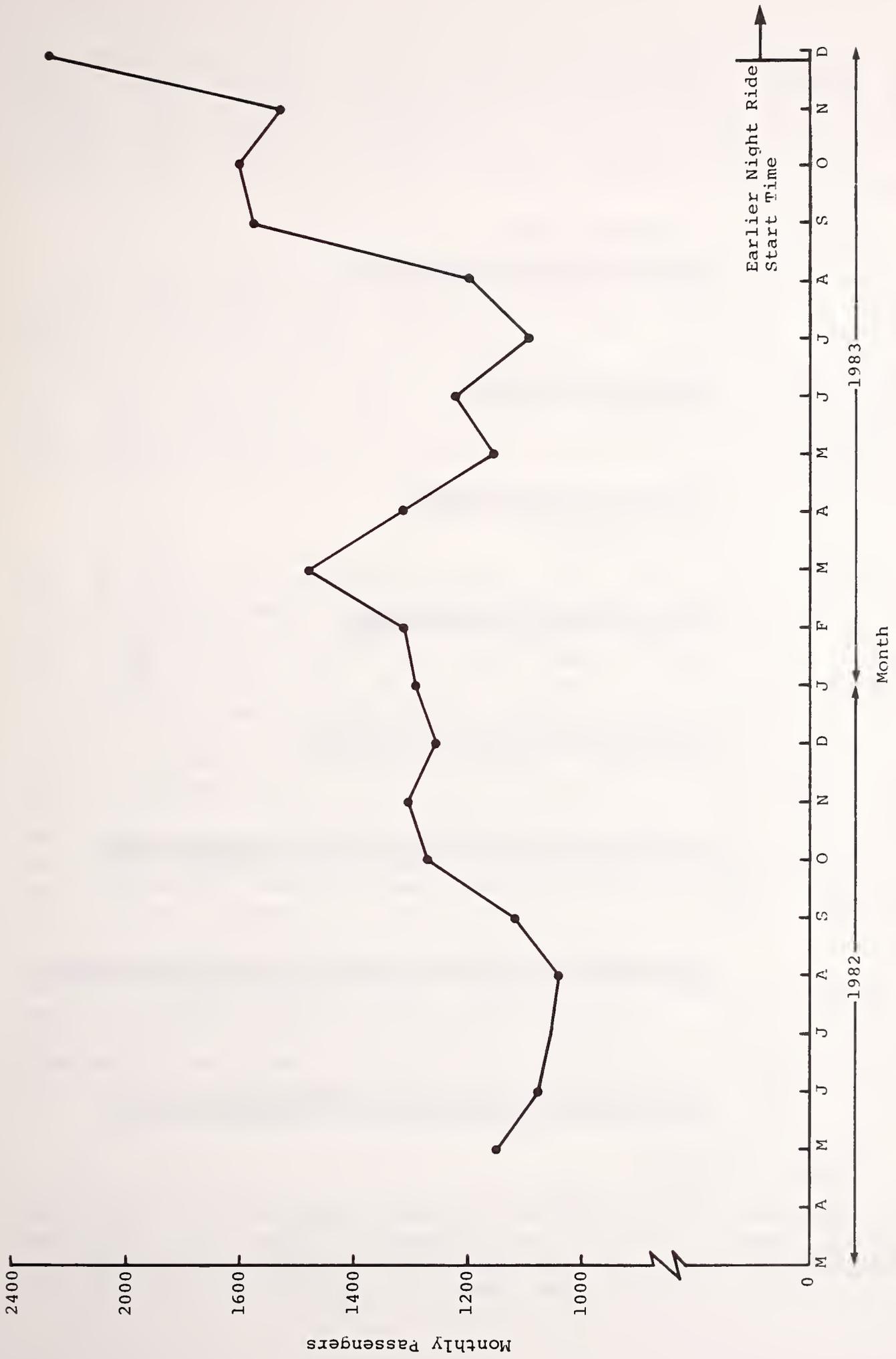


FIGURE 5-1. MONTHLY RIDERSHIP

began." "Cold weather month" was not as good a predictor as school months. Ridership during school months was 14-20% higher than during non-school months according to this model; however, it is difficult to be conclusive about this result since the coldest winter months also include more school holidays.

5.2.3 Weekday vs. Weekend Use

Data from two weeks of the dispatcher's ridership logs in February 1983 enable a comparison of weeknight and weekend ridership. Friday night exhibited the heaviest average ridership (76 riders). Saturday and Sunday with 47 and 42 riders, respectively, had ridership levels similar to that on weekdays (Monday through Thursday), which averaged 48. The substantially higher ridership on Friday probably results from the combination of week-night workers and weekend late-night non-work passengers.

5.2.4 Use by Time of Night

Although Night Ride was offered between 10 or 11 p.m. and 6 a.m., its ridership and vehicle hours are concentrated in the early part of the night. Figure 5-2 shows the usage levels by hour for all nights based on two weeks' data from the dispatcher logs in both February and December 1983. Note that on a typical night, half of the riders use the service before 1 a.m. In both February and December, the peak ridership occurs in the second service hour (11 p.m. to midnight and midnight to 1 a.m., respectively), while the low point occurs between 4 and 5 a.m. Note also that the December ridership is higher even excluding the extra service hour from 10 to 11 p.m., and that most of the ridership growth over that period occurred in the very late hours. This might indicate an even greater percentage of work trips than detected in surveys earlier in the year.

Figure 5-3 shows the February ridership by day of week as well as by hour. Although one might expect greater usage during later hours on weekend nights, the little weekend data available seems to indicate that ridership patterns on weekend nights are not substantially different from those on weekday nights.

5.2.5 Number of Users

To measure the ridership base requires a count of individuals served rather than passenger trips. The Veterans Cab dispatcher reviewed the logs for a two-week period in February 1983 to estimate the number of distinct (unduplicated)

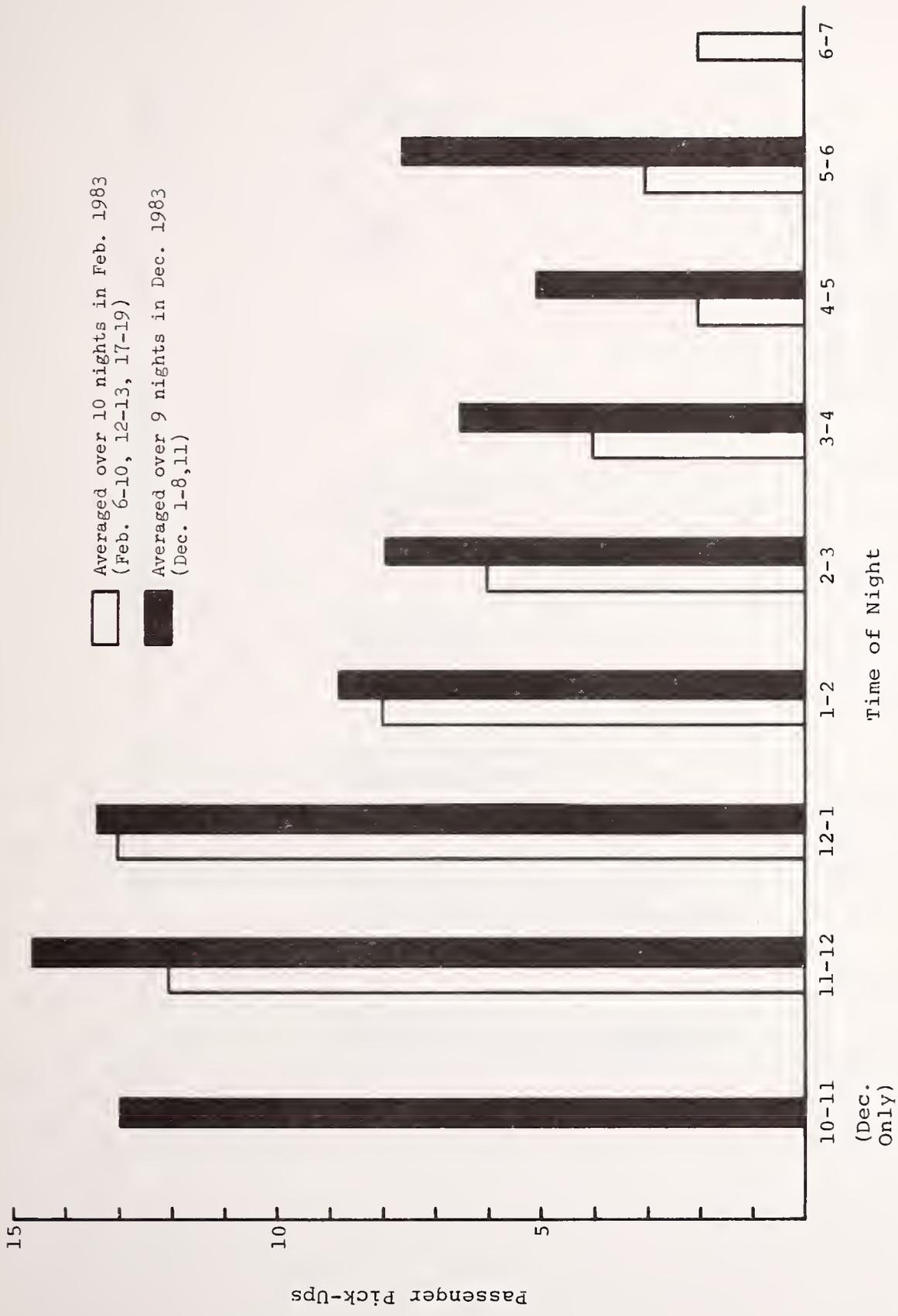


FIGURE 5-2. HOURLY DISTRIBUTION OF RIDERSHIP

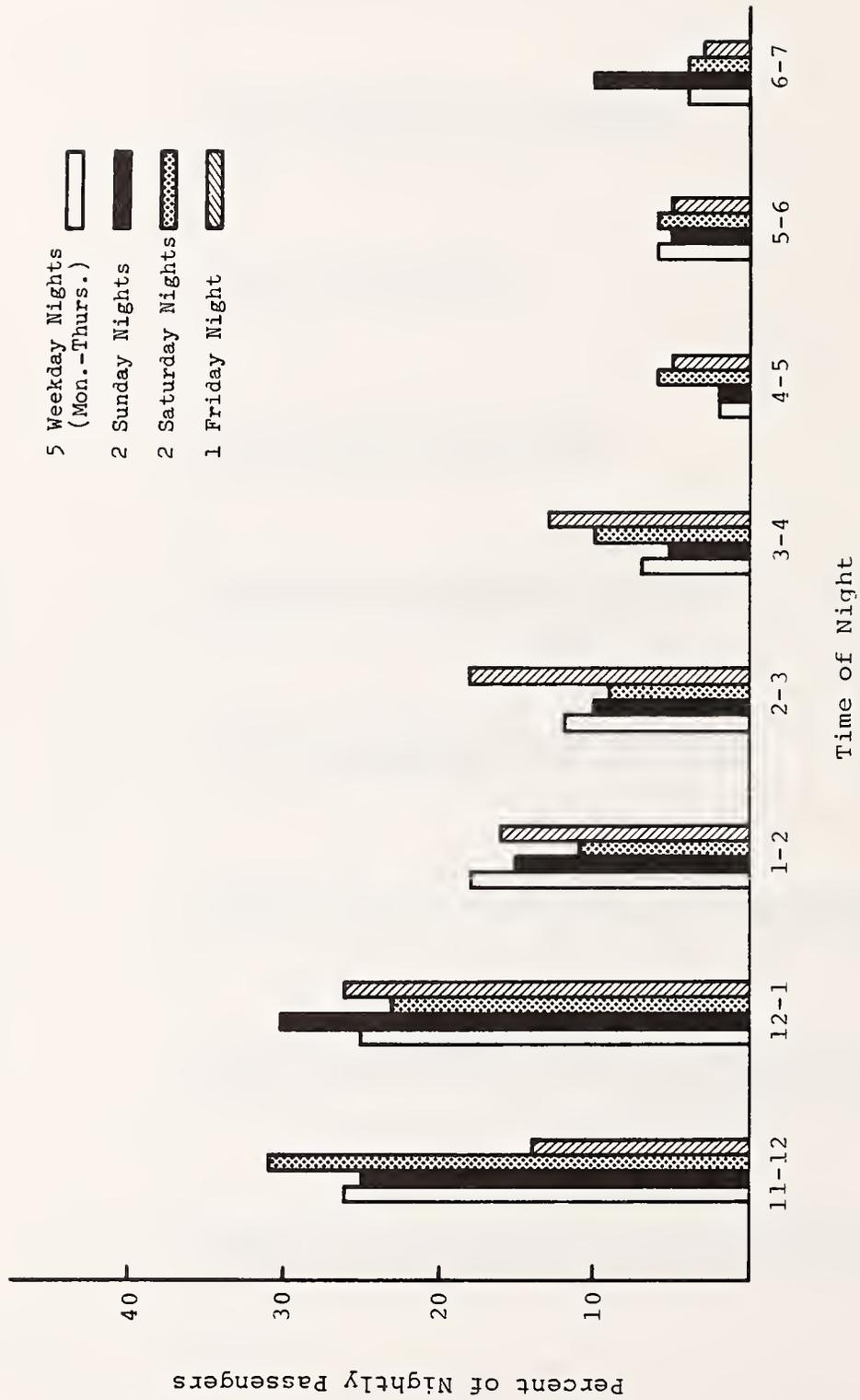


FIGURE 5-3. HOURLY DISTRIBUTION OF RIDERSHIP BY DAY OF WEEK
 BASED ON FEBRUARY 1983 DATA

users.* The analysis indicated that 342 individuals (+10) were responsible for the 649 trips made during those two weeks. This implies an average (one-way) trip frequency of 0.9 to 1.0 trips per week per individual user.** Since it indicated that the actual number of individual users was high, and that the service had a broad base of support, AATA was pleased to see that the trip frequency was low.

5.2.6 Actual vs. Predicted Usage

A pre-implementation survey of university students predicted that a little over half would use Night Ride and that they would make about one-quarter of their trips on the service. A follow-up survey of these university students, conducted after one month of Night Ride operation, indicated that 5% of the sample had used Night Ride just once and 3% had used the service more than once. Since the AATA estimates that most riders are occasional users, it is likely that, by the end of the demonstration, a much larger percentage of the original surveyed population had used Night Ride. (Unfortunately, it was necessary to proceed with the follow-up surveys in the same school year as the pre-implementation surveys, in order to make it feasible to recontact the same individuals.) Although the percentage of students who had tried the service was lower than predicted, those students that did make use of Night Ride more than once made over 40% of their nighttime trips on Night Ride. Finally, it should be recognized that rider projections of use of a new service are typically well in excess of actual use.

5.2.7 Demographic Profile of Users

Both the mailback survey and the in-vehicle interviews were used to develop a socio-economic profile of the Night Ride user population (see Table 5.1). While the sample sizes are

* This involved recognizing the addresses and traveling times of regular users. The methodology is subject to errors of under- and over-estimation, although these are probably limited, since individuals' homes usually are either the origin or destination of each trip.

** Note that other sources suggested higher trip frequencies. The surveys distributed in February indicated that respondents averaged 2.89 trips per week, while the April in-vehicle interviews, after adjustment for trip frequency bias in the response, estimated 1.59 trips per week. Unfortunately, each of these figures may also be subject to error.

Table 5-1. SOCIO-ECONOMIC CHARACTERISTICS OF USERS

		<u>Mailback Survey</u> (n = 52)	<u>In Vehicle Interviews</u> Unadjusted* (n = 66)	Adjusted for "Frequency of Use" Bias**
Sex:	male	33%	35%	39%
	female	67%	65%	61%
Age:	under 16	0%	4%	3%
	16-24	50%	56%	65%
	25-44	42%	35%	27%
	45-64	8%	5%	5%
	65 and over	0%	0%	0%
Annual House- hold Income:	under \$10,000	39%	N/A ⁺	N/A ⁺
	\$10,000-19,999	20%		
	\$20,000-29,999	16%		
	\$30,000-39,999	11%		
	\$40,000-49,999	6%		
	\$50,000 & over	8%		
Status:	full time employed	44%	60%	51%
	part time employed	29%	20%	24%
	undergraduate student	31%	15%	16%
	graduate student	12%	10%	15%
	homemaker	8%	2%	3%
	unemployed	8%	0%	0%
	other	2%	0%	0%

* Unadjusted results reflect the distribution of trips so that frequent users are counted more heavily than infrequent users.

** Adjusted results reflect the distribution of passengers (individuals).

+ Income is not available from the personal interviews conducted aboard Night Ride vehicles.

quite small (52 and 66 respectively), the relative percentages of the estimated user population is large enough to allow inferences to be drawn (see Appendix B). As might be expected, the user population is predominantly female, young and of low income. This may reflect the service's low cost, its value in providing some security from crime, the influence of auto availability on use, and the fact that students and young workers may be more likely to be traveling at night. The University obviously influences the socio-economic profile of Ann Arbor. Note that the 1980 Census, which includes students as part of the population of their school's community, shows that 33.8% of the population is between the ages of 15 and 24 and that 12.6% of the population has a gross annual household income under \$10,000.

One of the likely reasons for the lower than expected percentage of students among the passengers is the availability of free bus service in the earlier late-night hours for students within the main campus environs and to and from the north campus. Few Night Ride passengers were diverted from these buses, probably due to the free fare and scheduled nature of the university bus service. Of course, many students live and travel off-campus, where no university bus service is provided.

Despite the large university population and the high unemployment in Michigan during the survey period, about half of the Night Ride users are full-time employees. Among the full-time positions indicated by respondents to the in-vehicle interviews were nurse and hospital worker, restaurant and bar worker, and janitor; many others did not indicate their occupation. It should be noted that AATA fixed-route passengers actually exhibit similar characteristics.

The in-vehicle interview survey results were adjusted for trip frequency bias so that the sample best reflects users.* The adjusted results showed a less pronounced sex distribution and a more pronounced age distribution than the mailback survey. Since the mailback survey was distributed over a two week period, it was unlikely to suffer from frequency bias and was not adjusted for such bias; however, it was believed to suffer from a non-response bias, which may explain some of the differences between the results.

Surveys, conducted before Night Ride began operation, had identified the socio-economic groups most likely to use the service. Although low income people appeared more likely to use Night Ride, statistical tests on the survey data revealed

* Trip frequency bias occurs when frequent users are overrepresented in the survey sample because they are more likely to be intercepted by the survey.

that neither age nor income were significant factors (at the 5% level) influencing potential use. However, as expected, gender was a significant factor; females were found to be more likely to use Night Ride in each of the before surveys (general university, hospital, activity center and dial-a-ride user samples).

The income characteristics of Night Ride users might be expected to be similar to those of evening dial-a-ride users. The before survey of dial-a-ride users indicated 43% with incomes under \$10,000 and 30% with incomes \$10,000-19,999. The Night Ride user sample is somewhat more wealthy with figures of 39% and 20%, respectively.

For comparison purposes, note that 40% and 43% of Ann Arbor's fixed-route and dial-a-ride passengers, respectively, were male, according to recent AATA surveys. Furthermore, large numbers were young and/or students. Fixed-route passengers, however, were somewhat more likely to be low income; while 49% of fixed-route passengers earned under \$12,000, 39% of Night Ride passengers earned under \$10,000. Only 17% of the fixed-route riders were in the \$20,000-\$39,000 range, compared with 27% of Night Ride users. While this income distribution may be due to the use of Night Ride because of safety reasons or temporary car problems, rather than lack of an automobile alternative or low cost, the overall indications are that the market for Night Ride does not differ greatly in demographics from the daytime transit market.

5.3 TRAVEL BEHAVIOR

This section describes the characteristics of Night Ride user travel behavior including travel frequency, trip purpose, and mode choice.

5.3.1 Frequency of Use

As one would expect, passenger trip rates on Night Ride vary substantially among the sampled users. The mailback survey indicated an average of 2.89 one-way trips per week, while the unadjusted in-vehicle interviews indicated 2.62. When the in-vehicle interview sample was adjusted for trip frequency bias, the frequency dropped to 1.59 with a standard deviation of 1.33. The large difference between the mailback and the adjusted in-vehicle surveys is likely to be due to one or more of the following possible problems:

1. The mailback survey sample was subject to a frequency bias.
2. The mailback survey's non-response bias was directly related to trip frequency. This is

rather likely since a frequent user has more to gain if service is improved and is therefore more likely to complete and return a survey. The in-vehicle interviews are less likely to be subject to this non-response bias.

3. The method for correcting the frequency bias of the in-vehicle survey was inaccurate. The adjustment for frequency bias involves weighting responses in inverse proportion to trip frequency so that the individuals who use the service infrequently are adequately represented by the few such individuals encountered on the nights the interviews were conducted. If frequent riders overestimated their trip frequency and infrequent riders underestimated their trip frequency, the method could distort the results.

What is certainly evident from the frequency of use data is that the user population includes many occasional riders. Since riders were questioned about their trip making within a seven day period only, we cannot say what portion of riders used the service less than one day per week, or, on average, what the true trip rate is.

Night Ride users overwhelmingly use the service in only one direction, presumably to return home. Ninety percent of passengers interviewed on-board the vehicle indicated that they would not make any additional Night Ride trips that night. (Note that the interviews were performed in such a way as to represent the distribution of trips over the night.)

5.3.2 Trip Purposes

The typical Night Ride passenger used the service for a single trip purpose, at least based on the responses to a question about Night Ride trips during the week before the survey in which 53% indicated no other trip purpose. Perhaps, a longer history of trip making would have revealed other purposes.

The primary destination of Night Ride trips was "home," as might be expected on a late-night service that is used primarily in a single direction. Sixty-six percent of those interviewed on-board were returning home. Only two other trip destinations were noteworthy; 18% were going to work (predominantly non-university and non-hospital jobs) and 13% were going to a social-recreational activity. Only one person (less than 2%) was going to a bar or restaurant.

Thirty-one percent of all trip origins were work places (two-thirds of which were non-university and non-hospital jobs) and 23% were social-recreational activities other than bars or

restaurants. Only 3% were bars and/or restaurants. Twenty-nine percent were leaving their home. Overall, 93.5% of trips included home and 45.2% included work as either their origin or their destination.

The mailback survey shows fairly similar results: 35% returning from jobs, 12% from social-recreational activities, and 4% from bars or restaurants. The mailback survey's major difference is a reported 14% returning from educational activities compared with only 2% for the in-vehicle interviews. This difference may be due to the fact that the mailback survey was distributed every day for two weeks, resulting in a more representative balance of weekdays and weekend days than occurred with the in-vehicle interviews, which were conducted all night on two nights plus additional hours on three additional nights. The difference in time of year might be another contributing factor, although both surveys and interviews took place during full class schedule periods.

The fact that a large percentage of Night Ride trips are work trips was influential in AATA's decision to continue the service. Note also that since only a small percentage of users were returning from bars, the concerns of some riders about sharing the vehicle with an intoxicated stranger (a comment that had been voiced to the university housing office) may be somewhat exaggerated.

5.3.3 Primary Reasons for Using Night Ride

On the mailback survey and during in-vehicle interviews, passengers were asked why they chose Night Ride for their trip. In both cases, a plurality (48% in the mailback survey and 43% in the interviews) indicated "low cost" as the primary reason. (Note, however, that 19% of students responding to a follow-up survey indicated their reason for not using Night Ride was that it was too expensive.)

For those passengers who did not indicate low cost as their primary reason for using Night Ride, responses to the surveys and interviews differed considerably. While 33% of the mailback survey respondents indicated "safety" as their reason, only 7% (4 individuals) of interview respondents gave this reason. Instead, they listed "other" reasons and overwhelmingly indicated the lack of a car or any other alternative for the trip. Several specifically mentioned that their car was being repaired or that their car was unavailable "tonight." Unfortunately, neither the survey nor the interview specifically asked respondents whether a car was available "tonight." Many of the riders who indicated that there usually was a car available for their trip actually were unable to use their car on the night they used Night Ride. If they indicated low cost as their response (presumably because they were

comparing Night Ride with the taxi service), then the statistics may not accurately reflect their reason for using Night Ride.

Of the four respondents to the in-vehicle interviews who indicated that safety was the reason they chose Night Ride, two previously drove an automobile for the trip and one had not previously traveled due to lack of transportation. All four were females (representing 10.5% of all females responding to the question), were between the ages of 16 and 24, and were returning home. It is surprising that the interviews did not discover a larger number of women who rode Night Ride for safety reasons and who previously walked, got rides or didn't travel. The minor importance of safety in the interviews compared with the mailback survey may be due to the fact that:

- a. users were embarrassed to indicate safety in the in-vehicle interview; and/or
- b. the mailback survey had a non-response bias related to the importance of Night Ride to the users, which correlated with safety concerns and alternative mode availability.

If, however, safety was truly not an important consideration to users but remained a problem for the population, one might question Night Ride's success in meeting its stated objectives.

It is interesting to compare the actual reasons Night Ride passengers gave for choosing to use Night Ride with the responses of potential users to the pre-implementation surveys. These latter surveys indicated that safety was the most important attribute of nighttime travel modes among university students and hospital workers, while low cost was most important among the evening dial-a-ride users (who generally have lower incomes). For the university and hospital samples, low cost and short travel time were about similar in importance. A follow-up of university students, just after Night Ride was implemented, showed 60% indicating safety as the primary reason for using Night Ride and 37% indicating low cost; no one indicated short travel time as a primary reason, likely due to the fact that total travel time on Night Ride is so long.

The general conclusion that one may draw is that although Night Ride was initiated largely in response to a perceived need for improved safety for female students and hospital employees, it has found a substantial market among Ann Arbor residents who need to travel to/from late-night jobs in an economical way. For many of these, Night Ride did not substitute for walking but for other vehicular modes; thus safety was not a primary consideration for many riders. Since

work travel is clearly an objective of AATA's daytime bus services, one can characterize Night Ride as an effective substitute for nighttime fixed-route bus service. As a result, one may conclude that the service concept could be useful to any transit authority with demands for transit service in hours of low demand.

5.3.4 Reasons for Not Using Night Ride

The follow-up surveys of university students (which included a sample of users of computer and library facilities, as well as, a general student population sample) offered an opportunity to ask the 92% who were non-users why they had never used Night Ride. The majority (55%) of these respondents indicated that they had other travel options, while another large segment (31%) indicated that they did not travel after 11:00 p.m. A number of travelers also indicated that the service was too expensive or that the wait was too long, among other reasons. Of course, awareness of the service has not been an issue among this group since they had been surveyed just prior to Night Ride implementation and were informed about the service.

5.3.5 Alternative Modes

Approximately half of the users usually do not have a vehicle available for their nighttime trips. Of those users with alternatives, almost 1/4 to 1/3 can usually drive an automobile (see Table 5-2). This may seem surprising, at first glance, since one would assume that driving would be the preferred alternative. However, many of the users did not have a choice the night they used Night Ride. Some others did choose Night Ride over alternatives; several factors may contribute to these individuals' choice to use Night Ride:

1. A perception that Night Ride is safer than driving since it offers door-to-door service and a driver escort.
2. Some individuals dislike driving, particularly at night.
3. Hospital workers have difficulty finding a convenient and safe parking location.

There is a marked difference between the mailback survey and in-vehicle interview samples in the availability of rides in automobiles (as a passenger). It is not clear why such a large difference exists.

Table 5-3 indicates a variety of other modes used for the particular nighttime trip (during which the respondent was surveyed). This characteristic also distinguishes the in-vehicle interview from the mailback survey. Mailback survey respondents were more likely to walk alone than the in-vehicle

Table 5-2. ALTERNATIVE MODES AVAILABLE AT NIGHT

	Mailback Survey (percent)	In-Vehicle Interviews* (percent)
Automobile Driver	25	33
Automobile Passenger	29	3
Bicycle	15	11
Motorcycle/Moped	2	2
No Alternative	42	57

*Adjusted for Trip Frequency Bias

TABLE 5-3. OTHER MODES USED FOR THIS TRIP

	Mailback Survey (percent)	In-Vehicle Interviews* (percent)
Only Night Ride**	25	48
Walk Alone**	25	5
Walk With Others	12	3
Automobile Driver	25	17
Automobile Passenger	44	28
Taxi	25	15
University Bus	2	3
Bicycle	6	2
Motorcycle/Moped	2	-
Other	4	3

* Adjusted for Trip Frequency Bias

** Difference between the survey and interviews is significant at 95%

respondents who were likely to use Night Ride exclusively for the trip in question. Other apparent differences shown in Table 5.3 are not statistically significant. (Note that since our survey samples are rather small, differences must be substantial to be significant with 95% confidence, the typical confidence level reported). While it is difficult to explain why the two surveys of users reveal a number of different characteristics, both surveys indicate that a substantial portion of the passengers rely on Night Ride exclusively.

5.3.6 Diversions from Other Modes

Night Ride's users are drawn from a number of sources (see Table 5.4). Interestingly, more passengers were diverted from the automobile than from regular taxis, walking with others and walking alone combined. The in-vehicle interviews indicated that 25% previously drove an automobile for the intercepted trip. Adjusting for those who either lived outside Ann Arbor or did not need to make the particular trip prior to the introduction of Night Ride, the percentage climbs to 30%. This high percentage of choice riders is somewhat surprising. There are several possible explanations, the most likely being that a large number of these individuals used Night Ride because their usually available automobile was unavailable on that night. They therefore appeared to be diverted from automobile but in fact had no choice on the night in question. There are other possible explanations as well. Perhaps these travelers previously drove during the day just to be able to drive home. If so, Night Ride enabled them to use transit, possibly the preferred daytime mode, and to use Night Ride as needed for the return trip. Perhaps Night Ride serves as a back-up mode when other modes (such as a ride from a friend or associate) are unavailable or when the traveller is returning home later than usual. A question that was not addressed in the survey is the extent (if any) to which Night Ride increases the use of transit for the other, presumably earlier, portion of the round trip.

A small portion of riders (5% of the in-vehicle sample and 14% of the mailback sample) indicated that they previously did not travel due to inadequate transportation; and a few others chose to travel earlier in the evening on dial-a-ride. Of those who did make the trip before Night Ride was available, 20-25% walked.

Respondents to the surveys were asked how many of their Night Ride trips in the past week would be made by taxi if Night Ride were unavailable. Almost every in-vehicle interview respondent indicated that 90% or more of their Night Ride trips would be made by taxi. This is in sharp contrast to the small percentages that indicated that they previously used a taxi (9%) and that currently use taxis (15%) for the surveyed trip.

TABLE 5-4. MODE USED FOR THIS TRIP BEFORE NIGHT RIDE

	Mailback Survey (percent)	In-Vehicle Interviews* (percent)
Did Not Live in Ann Arbor	8	5
Did Not Need to Make This Trip Then	12	12
Did Not Travel Due to Inadequate Transportation	14	5
Traveled Earlier on Dial-a-Ride	6	2
Walked Alone	12	16
Walked With Others	-	2
Automobile Driver	10	25
Automobile Passenger	19	14
Taxi	12	9
University Bus	4	5
Bicycle	2	-
Other	4	5

*Adjusted for Trip Frequency Bias

This may again be due to an "unavailable auto" as described earlier, or perhaps, Night Ride has really served to generate new markets for taxis rather than usurp the existing taxi market.

Records maintained by Yellow Cab, the operator that does not currently have the Night Ride contract, indicate that the company experienced substantial relative decreases in nighttime ridership of exclusive-ride taxi after Night Ride was implemented. Comparing similar months before and after Night Ride was initiated, average monthly nighttime ridership was down about 20%, while daytime ridership on Yellow Cab was down by only 5% (see Section 6.4.2). Statistical tests indicate that the 5% change is not significant. The nighttime percent change is on average 17% greater than the daytime percent change. While there is variation from month to month, the difference stands up to statistical tests with only a 5% chance of error. If Yellow Cab was losing business, one could attribute it to Night Ride or to other influences. Although ridership could also have been lost to Veterans Cab exclusive-ride service, Veterans Cab personnel have indicated an opposite effect; they claim that many Night Ride passengers

call Yellow Cab for exclusive-ride service after being informed that Night Ride is not available or will take some time to arrive. (Probably, callers erroneously assume Veterans Cab would not be able to respond quickly to an exclusive ride call, as well.)

The fact that a diversion from exclusive-ride taxi appears to have occurred indicates that for a portion of the exclusive-ride taxi ridership, low cost was more important than the "safety" and privacy of riding alone (as well as the shorter response time).

Very few riders appear to have been diverted from the Nite Owl, a university-sponsored circulator bus which operates every half-hour until 2:00 a.m. This is most likely due to the fact that Nite Owl serves a limited service area in the vicinity of the main campus and offers free, scheduled service to that market. Thus, Night Ride is not in direct competition with the Nite Owl.

5.3.7 Influence on Nighttime Travel

Although Night Ride offers an alternative means for travel to some and the only vehicular option for others (aside from exclusive-ride taxi), few passengers reported that Night Ride affected their travel behavior. Only 4% of the users interviewed indicated that they made more frequent trips at night due to Night Ride. Given the fact that 57% said they had no vehicles usually available to them, it appears that there was little latent demand for nighttime travel.

5.4 SUMMARY

Night Ride served an average of 50 passengers per night by the time the demonstration ended. Ridership grew over the period of the demonstration and exhibited higher ridership (by about 11-15%) in the winter season when the university was in full session and walking outdoors is least pleasant. Ridership peaked on Friday nights when weeknight work and late-night recreational travel were combined. Travel on Friday night also peaked late in the night. In general, peak travel times were at the fringe of the Night Ride service hours.

The ridership included many occasional users with the average user observed in a two week period making one one-way trip per week. As expected, the users were predominantly female, young and low income. Two-thirds were female, and the incidence of those aged 16-24 was almost twice that in the population as a whole. Despite the large university student population, about half the users were full-time employees.

Night Ride is typically used in one direction only and for a single purpose. Almost all trips are either to or from home. About half involve work trips and only a tiny percentage were reportedly going to or returning from bars or restaurants.

Safety proved to be a much less important reason for using Night Ride than originally expected or than projected in pre-implementation surveys. In the mailback survey, which is viewed as more reliable on this issue, 33% reported safety to be the reason for use. However, low cost, presumably in comparison with exclusive-ride taxi, was the reason of about half the respondents in both user mailback surveys and user in-vehicle interviews.

About half the users indicated having no nighttime travel alternatives, however, one-quarter to one-third usually can drive. Many of these had a problem with their vehicle on the night they used Night Ride. Only a small portion of the ridership indicated that they didn't travel due to inadequate transportation and that Night Ride had significantly affected their nighttime travel. Although only a small portion usually used taxis for their trip before Night Ride was available, almost all indicated it would be their choice for that night's trip if Night Ride were unavailable. The other Ann Arbor taxi company, Yellow Cab, reported an average drop of 20% in nighttime ridership against a daytime drop (presumably unaffected by Night Ride) of only 5%.

The analysis of ridership and travel behavior has shown that:

- 1) the service can attract a ridership that will support the service at the given fare and subsidy level;
- 2) female and low-income riders will be especially likely to take advantage of the service;
- 3) a large percentage of occasional riders gives the service a broad base;
- 4) as on daytime transit, work trips will make up a large portion of the trips;
- 5) the service offers a transit alternative to some users with no other low-cost alternative at night.

6. PRODUCTIVITY AND ECONOMICS

This chapter discusses the productivity of the service and the economic impacts on the operator and the sponsor of the service, and on exclusive-ride taxicab operations.

6.1 PRODUCTIVITY

Night Ride was intended to enable nighttime transit to be operated by a taxi operator. Its low fares were made possible through a subsidy from the AATA and by increasing taxi vehicle productivity. To the extent that shared-riding occurs while maintaining reasonable levels of service (in terms of ride and response times), such service can be successful and viable. This section examines several productivity issues, including:

1. the number of passengers served per vehicle-hour
2. the extent of shared-riding
3. the total cost of providing service

6.1.1 Passengers Served Per Vehicle Hour

The productivity of Night Ride service, measured as the (monthly) average number of passengers served per vehicle hour, increased over the demonstration period from a low of about 2.75 to its highest value of 4.20 in October 1983, an increase of 53% (see Figure 6-1). Average productivity fluctuated in response to seasonal variation in ridership and service levels; in the 1982-83 service year productivity peaked in March at 3.77, 7% higher than the October 1982 level. Consequently, one might expect productivity to increase beyond October 1983's level of 4.2 as the winter progresses, although no causal relationship with season has been proven.

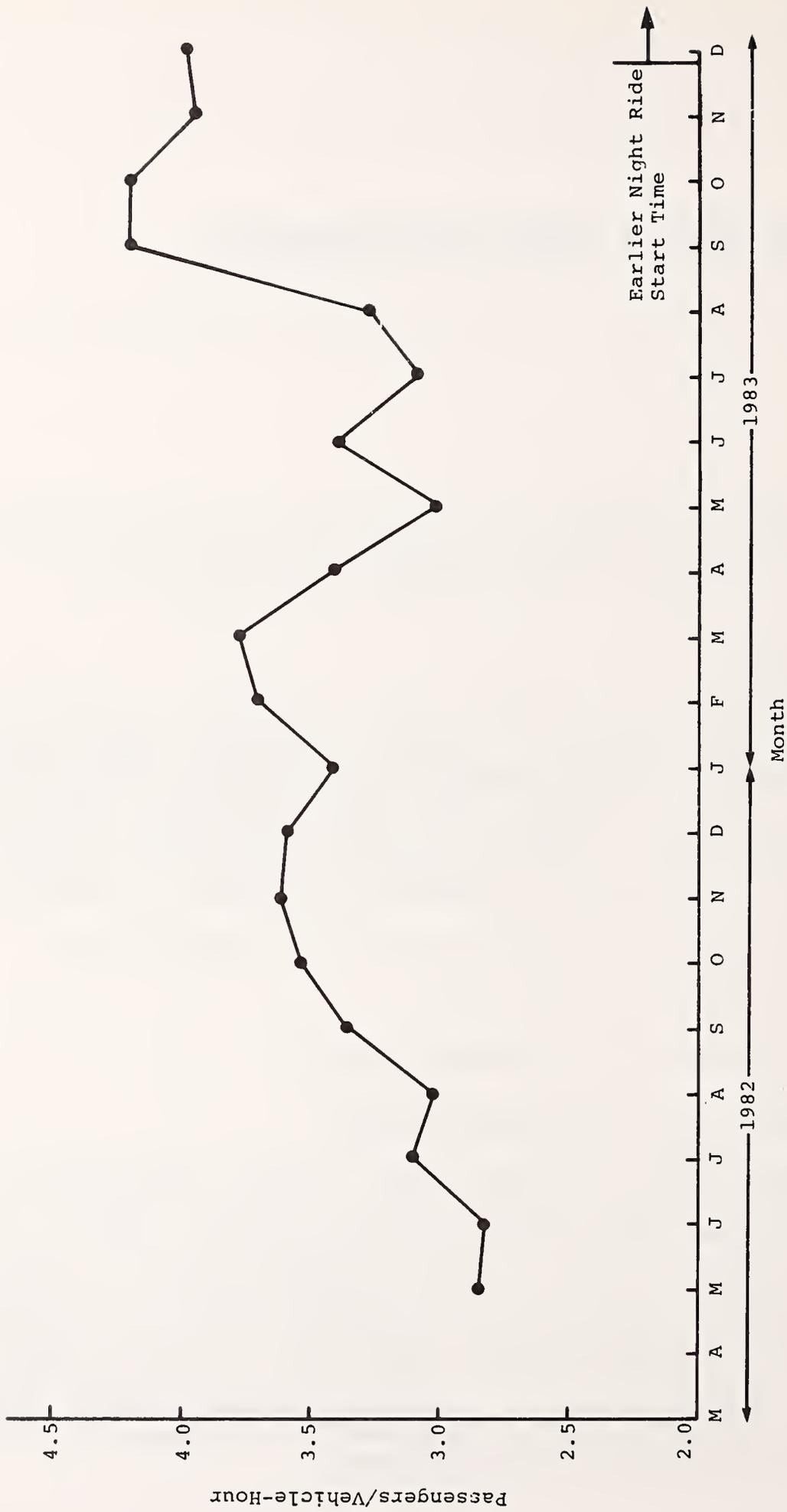


FIGURE 6-1. NIGHT RIDE PRODUCTIVITY

When the dispatcher was changed in September 1983, productivity experienced a noticeable increase over the previous levels. The AATA believes that the dispatcher was a significant factor affecting vehicle productivity, since he is responsible for grouping trips and assigning them to drivers. However, the driver determines the order of pick-up and drop-off and the route to take between them, and furthermore, the dispatcher does not have complete control over the number of vehicles in service at any given time.

It is difficult to evaluate the effectiveness of the individual dispatchers since one cannot be assured that the optimal number of vehicles were in service or that the driver selected the optimal order of pick-up and drop-offs. Since manual methods were used for both of the above, one would expect that typically a "sub-optimal" situation was achieved.

Unfortunately, since there are no other nighttime shared-ride taxi services with which to compare Night Ride, we are limited to comparisons with daytime services. Table 6-1 provides a summary of productivity statistics for several shared-ride taxi services of similar size. All but one of these operate solely in daytime hours and all have demand densities of 3-6 times the level of Night Ride. The productivities of these systems range from 4 to 6 passengers per vehicle hour, with an average of 4.9. This is the productivity of the Fullerton system, which is most similar to Ann Arbor in terms of area size and population. In comparison, Ann Arbor has an average monthly productivity of 3.4 in FY 1983 (and a maximum monthly productivity of 4.2). Considering that Night Ride operates during late-night hours only, and at much lower demand densities, one concludes that Night Ride is relatively productive.

6.1.2 Shared-Riding

Although Night Ride operated as a shared-ride service, some trips were completed without any actual sharing taking place. Based on data for 36 sample nights in February, November and December 1983, 93.4% of trips were shared-ride, with a range of 81-100% on a daily basis. Figures 6-2 and 6-3 provide snapshot views of vehicle occupancy (i.e., the number of passengers in each dedicated vehicle) at five minute intervals for two selected cabs on November 6 and 8, 1983. Note that both provided service all night but that in the first case, no vehicle sharing occurred from 1:20 - 5:30 a.m., and that for a substantial portion of this time there were no passengers at all.

TABLE 6-1. COMPARISON OF GENERAL MARKET SRT SYSTEM PRODUCTIVITIES*

	<u>Service Times</u>	<u>Service Area (Sq.Mi.)</u>	<u>Service Area Population</u>	<u>Average Hourly Demand Density (Weekday Trips Per Sq.Mi.)</u>	<u>Passengers/ Vehicle-Hour</u>
Arcadia, CA	Daytime	11.3	46,400	1.07	5.7
El Cajon, CA	24-Hours	12	60,500	1.91	4.0
Fullerton, CA	Daytime	22	94,000	1.40	4.9
Ontario, CA	Daytime	32	102,800	1.09	4.5
Orange-Villa Park, CA	Daytime	19.6	92,500	1.96	5.9
San Bernadino, CA	Daytime	16	85,000	1.72	5.0
Birmingham, MI	Daytime & Fri. early evening	6	34,000	1.71	4.6
Average		17	73,500	1.55	4.9
Night Ride	Nighttime	23.5	106,000	0.29**	3.4 FY83 (4.2 Max.)

* Systan, Inc., Paratransit Handbook: A Guide to Paratransit Systems Integration, Volume II, Final Report, prepared for USDOT, February 1979.

** Based on Monday through Thursday nights, early February 1983.

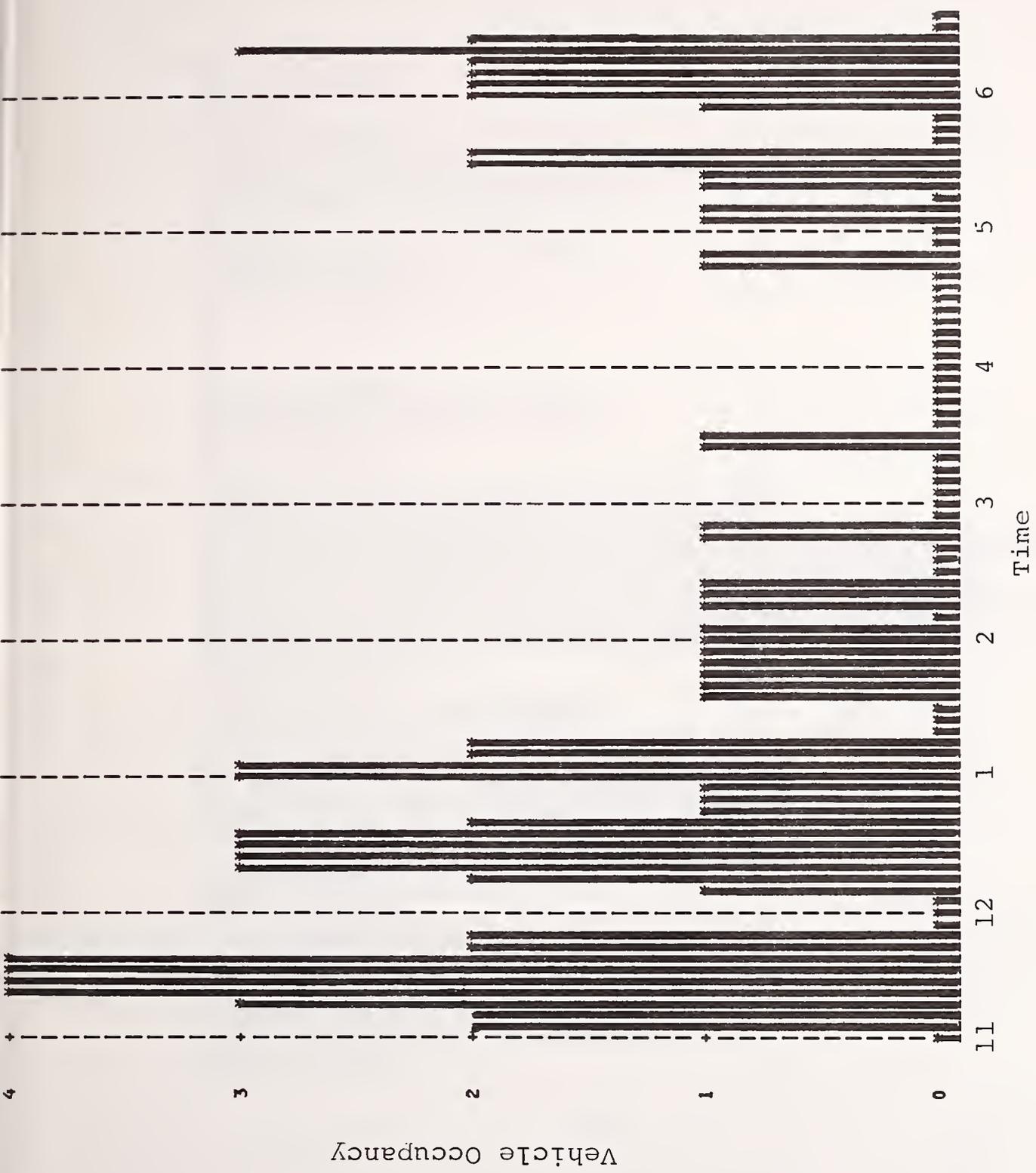


FIGURE 6-2. NIGHT RIDE VEHICLE OCCUPANCY:

NOVEMBER 6, 1983, Cab #9

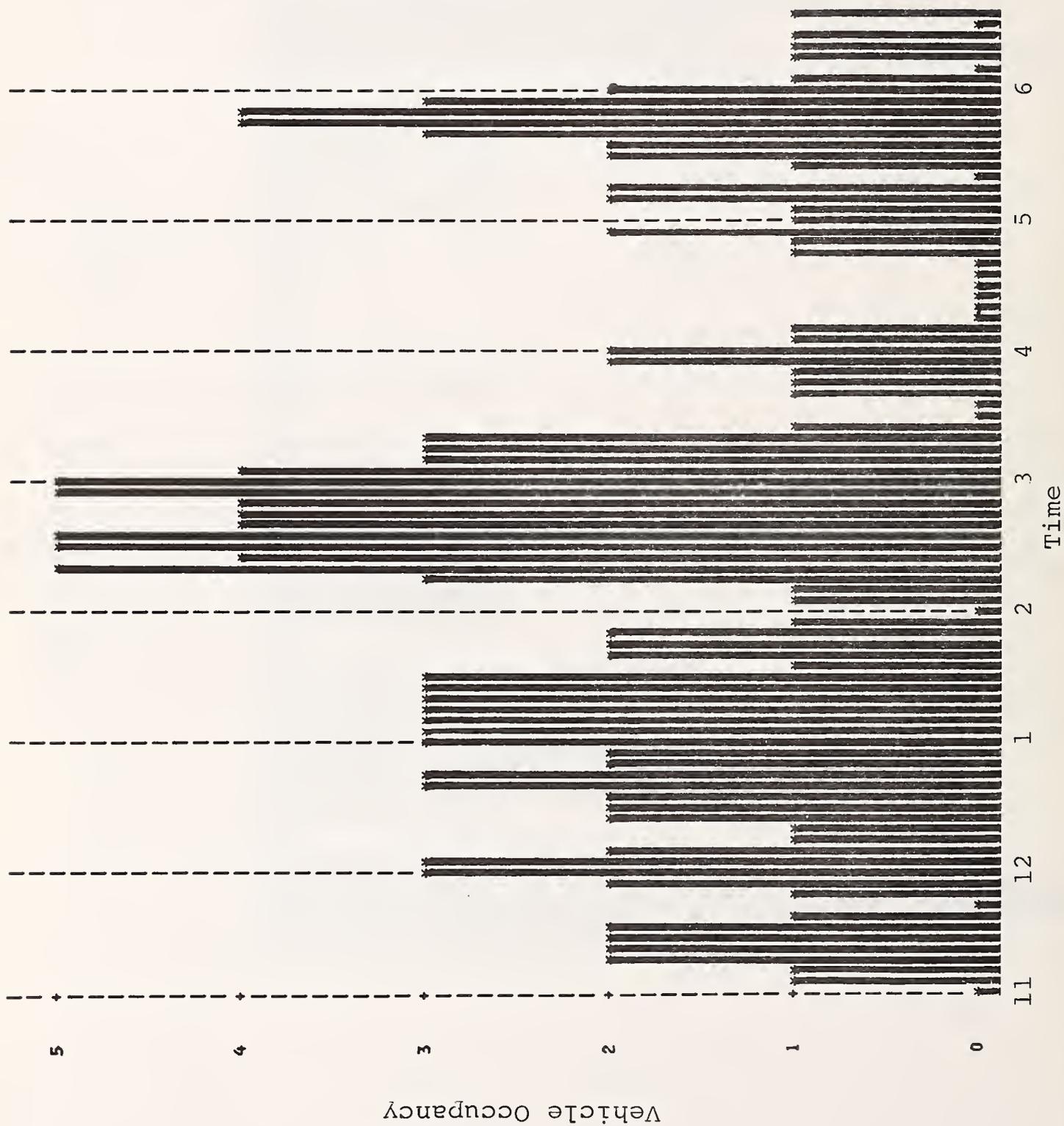


FIGURE 6-3. NIGHT RIDE VEHICLE OCCUPANCY:

NOVEMBER 8, 1983, CAB #56

Figures 6-4 and 6-5 show how average vehicle occupancy varied over the course of the night, for two-week periods in February and November 1983. Note that in February, the average occupancy was greatest between 11:30 p.m. and 12:40 a.m., at about 2:30 a.m., and early in the morning after 6 a.m. Also note that the maximum average occupancy is only 2.0. In November, the peak and average occupancy appear to be much higher, though productivity increased by only 5%. The standard deviations, measures of variability in vehicle occupancy from day to day, vary substantially particularly at the times which exhibited the highest average occupancy; however, since the distribution of occupancy is unlikely to be normal, the standard deviation is not a very good statistical measure of day-to-day variability.

6.2 IMPACT ON THE AATA

6.2.1 Start-Up Costs

Start-up costs for the service included administrative costs and marketing costs. It is estimated that these totalled \$6,650; \$5,680 for marketing and \$970 for administration. Start-up marketing included efforts undertaken in March 1982 as well as efforts at the beginning of the school year, the following September.

6.2.2 Subsidy

For the one year period from October 1982 through September 1983 (FY 1983), AATA provided 4413 vehicle hours of service at a subsidy of \$30,979.* Since the number of riders carried during this period was 15,455, the subsidy cost per passenger (excluding administrative and start-up costs) was \$2.00.

Table 6.2 provides a comparison of the subsidy per passenger in FY 1983 for Night Ride with those for other AATA services. Note that Night Ride is much less subsidized on a passenger basis than evening dial-a-ride, a service provided during a period of higher demand. Of course, dial-a-ride fares were only 60¢, while Night Ride cost \$1.50.

Table 6.2 also indicates the percentage of the total operating cost paid by the user. Night Ride users pay 43% of the total cost, while fixed-route users pay only 22% and general public dial-a-ride users only 7%. It is a noteworthy achievement that service is being provided in a demand-responsive manner during low demand time periods at such a high user share of total cost.

* Included in this cost is the hourly subsidy provided to the taxi operator plus the direct costs of the additional telephone service needed for Night Ride.

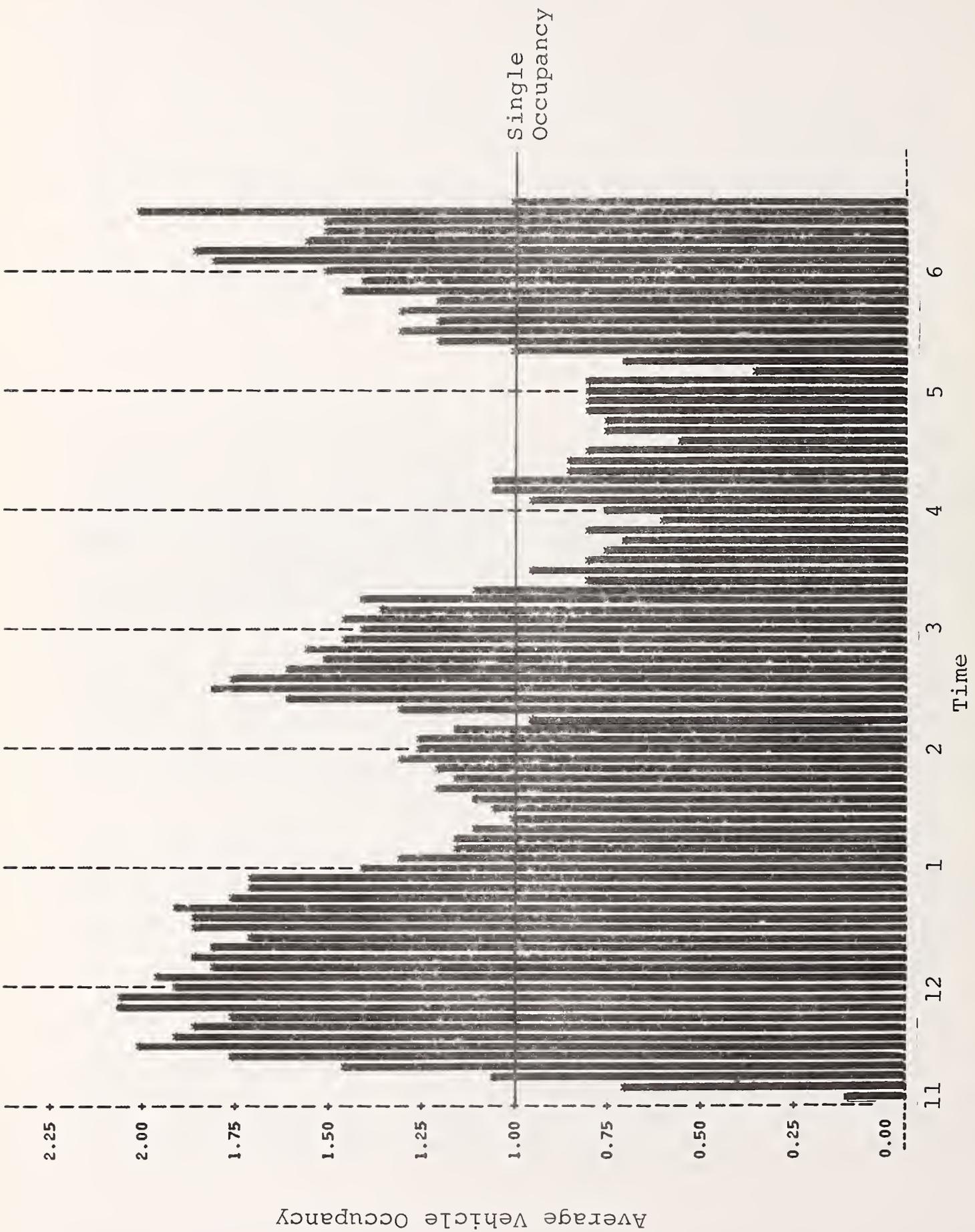


FIGURE 6-4. NIGHT RIDE VEHICLE OCCUPANCY:
AVERAGE, FEBRUARY 1983

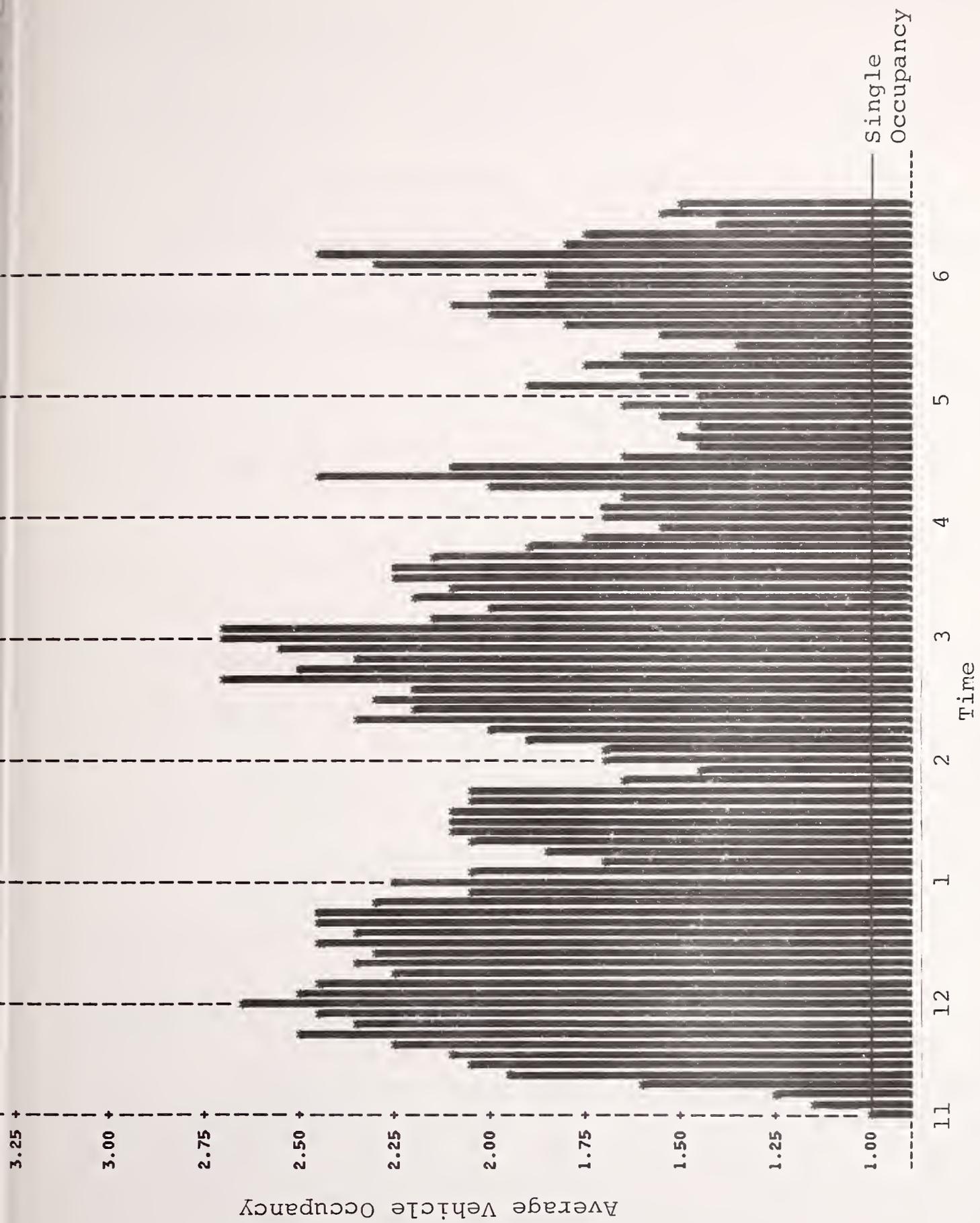


FIGURE 6-5. NIGHT RIDE VEHICLE OCCUPANCY:

AVERAGE, NOVEMBER 1983

TABLE 6-2. ECONOMICS OF AATA SERVICES (FY 1983)

	<u>Cost/Pass.</u>	<u>Subsidy/Pass.</u>	<u>Revenue/Pass.</u>	<u>User Share of Cost</u>
Night Ride	\$ 3.50	\$ 2.00*	\$ 1.50	43%
Evening & Sunday Dial-a-Ride	\$ 5.14	\$ 4.79	\$ 0.35+	7%
All Fixed-Routes (all times)	\$ 1.62	\$ 1.27	\$ 0.35+	22%
Route #6 (6:45-11:15 p.m.)	n.a.	\$ 1.67**	n.a.	n.a.
Route #6 (10:15-11:15 p.m.)	n.a.	\$10.05**	n.a.	n.a.

* Excludes administrative expenses estimated at \$0.15 per passenger.

** Based on October and November 1983. Route #6 was the only fixed-route operating in the evening until December 1983.

+ Reflects the distribution of regular and discount fares.

6.2.3 Ongoing Administrative Costs

Ongoing administrative costs were estimated to be \$3,400 as of September 30, 1983 or an average of \$2,205 per year. This covers time of the Manager of System Development, the Planning Coordinator and support staff at the AATA. The ongoing administration of the Night Ride contract averaged less than 8% of the transportation contract (subsidy) cost.

6.2.4 Ongoing Marketing Costs

All of the marketing efforts undertaken by the AATA are properly considered start-up costs, although some portion of the start-up marketing budget was reserved for use at the start of the school year.

6.2.5 Total Cost

Table 6-3 summarizes Night Ride's cost to the AATA over the course of the demonstration and on an annual basis. Since the last quarter's costs were not available at the time of this writing, project costs reflect 18½ months of operation. Since the demonstration ultimately ran for almost two years (from March 15, 1982 to December 31, 1983), start-up costs have been spread over a two-year period. Demonstration/evaluation costs for the most part would not be duplicated in other applications of the service concept and have been separated from other project costs.

TABLE 6-3. COST TO THE AATA

		<u>Project Start to 9/30/83</u>	<u>Annual</u>
START-UP:	Staff and Administration	\$970	\$ 485 *
	Marketing	\$5,680	2,840 *
	Subtotal	\$6,650	3,325 *
ONGOING:	Staff and Administration	\$3,400	\$2,205
	Subsidy (Taxi Contract)	\$45,836	\$29,731
	Subtotal	\$49,236	\$31,936
TOTAL PROJECT COST		\$55,886	\$35,261
DEMONSTRATION/ EVALUATION:			
	Staff and Administration	\$4,370	N/A
	Data Collection	\$3,728	N/A
	Travel	\$845	N/A
	Subtotal	\$8,943	N/A
TOTAL DEMONSTRATION COST		\$64,829	N/A

* Assuming a two-year duration

Based on start-up and operating costs which total \$55,886 and a ridership of 23,020 as of September 30, 1983, the AATA subsidy per passenger was \$2.43. Recognizing that this period did not reflect the steady state situation, subsidy per passenger has been calculated based on FY 1983 (October 1982 through September 1983). Excluding start-up and administrative expenses, the subsidy per passenger for FY 1983 is \$2.00. If we include the annual cost of administration, this increases to \$2.15, and with start-up costs, \$2.36.

6.2.6 Benefits to the AATA

The AATA was successful in meeting the goals it outlined for this demonstration project, as described in Chapter 1. The AATA:

- developed a contract relationship of mutual benefit with a private taxi company,
- obtained public goodwill in attempting to address an expressed need for safe nighttime transportation,
- served nighttime travel demands at a lower per passenger subsidy cost than AATA had experienced for evening service,
- demonstrated the feasibility of late-night shared-ride service, and
- avoided hiring a nighttime dispatcher for an expansion of evening dial-a-ride and eventually eliminated evening dial-a-ride entirely.

6.3 CONTRACTOR COSTS, REVENUES AND PROFITABILITY

Because Veterans Cab views information on the costs of service as proprietary, detailed breakdowns of cost were not made available for the evaluation. As a result, the following discussion of costs, revenues and profitability is severely limited.

6.3.1 Costs

Veterans Cab was able to employ a single dispatcher to handle both exclusive-ride taxi and Night Ride calls and taxi dispatching, although a separate telephone line was needed. This joint use of the Veterans dispatcher was as seen by the AATA a key efficiency that would be obtained by contracting for service. In December 1983, when ridership was highest, Night Ride averaged 75.5 service requests per night or 11 per hour. During the first two weeks of December the maximum number of requests in any hour was 20. Assuming none of these service

requests were reserved in advance, and assuming that Veterans Cab continued to receive numbers of requests for exclusive-ride taxi service similar to those in February 1982, when the maximum number of calls per hour was 60, one may estimate that the dispatcher had to answer 80 calls per hour at a maximum. This represents an increase of 33% and would decrease the average time between calls at this busiest hour from 1 minute to 45 seconds. Veterans Cab's manager does not see this as being a problem, and estimates even 12 seconds per call is sufficient for an experienced dispatcher.

Only one full-time Night Ride driver and one part-time driver were paid wages. Additional service hours were provided by other lease drivers who received discounts on their lease fees (plus fuel costs) as compensation for their role as Night Ride drivers.

6.3.2 Revenues

Night Ride revenues received by the taxi operator included a \$1.50 fare per passenger plus a subsidy per vehicle hour of \$6.00 until mid-March 1983 and \$7.50 afterwards. In the last month of the demonstration, December 1983, these revenues were \$3508.50 and \$4417.50, respectively, for a total of \$7,926.00. Note that 44% of the revenue depended on passengers carried. During FY 1983, the total revenue to the taxi company for Night Ride service was \$53,283, or \$12.07 per vehicle hour.

6.3.3 Profitability

Veterans Cab submitted its bid for Night Ride based on a service cost of \$12.75 per vehicle-hour. Assuming that profitability of the nighttime service was based on meeting this figure, then FY 1983 as a whole proved unsuccessful with revenues falling short by 68¢ per hour. However, during the last six-month period (July-December 1983), when the subsidy was at the higher rate of \$7.50 per hour, revenues averaged \$14.06, which exceeds the \$12.75 by 10%. Assuming that an inflation factor of 5% is appropriate for the second year of service, it appears that the service had become profitable (on a monthly basis) by the end of the demonstration.

6.4 ADDITIONAL OPERATOR ISSUES

6.4.1 Perceptions of Taxi Drivers and Operators

Veterans Cab drivers typically lease cabs from the company. Only a small number of Veterans Cab taxi operators served as Night Ride drivers. Night Ride has employed several drivers, some of which also lease cabs for exclusive-ride service, while others do not. The Night Ride driver who drives the most hours is not a lease driver; he preferred the "steady

paycheck" aspect of Night Ride compared to the uncertainty of driving a regular cab in a lease system. He also reported that some passengers do tip, usually 50¢. If we assume the average tip per passenger was 30¢ and the productivity was 4.0, the average hourly tip would be \$1.20, adding about 25% to the driver's wage.

6.4.2 Impacts on Exclusive Ride Taxi Ridership and Operations

Since only one of Ann Arbor's two taxi companies, Veterans Cab, was awarded the service, each company was affected differently by Night Ride. Yellow Cab, the larger of the two, claims that it has lost ridership and regular customers to Night Ride. Table 6-4 shows Yellow Cab's data on the ridership drop from the previous year for each month in the period from February 1982 to May 1983. Comparing statistics for April 1982 through February 1983 to the same period one year earlier indicates reductions occurred in almost every month in both nighttime and daytime ridership. The reductions in these two time periods are statistically different at the 95% confidence level while the daytime ridership decrease is not statistically significant. This seems to confirm Yellow Cab's claim.

TABLE 6-4. YELLOW CAB RIDERSHIP IMPACTS

<u>Month:</u>	CHANGE IN YELLOW CAB RIDERSHIP FROM PREVIOUS YEAR:	
	<u>Nighttime</u> (11 p.m. - 6 a.m.)	<u>Daytime</u> (6 a.m. - 11 p.m.)
February 1982	-28%	-14%
March	-30%	-17%
April	-12%	0
May	-38%	-12%
June	-2%	+4%
July	-14%	0
August	+2%	+3%
September	-25%	-9%
October	-34%	-12%
November	-15%	+9%
December	-21%	+1%
January 1983	-38%	-23%
February	-51%	-18%
March	-34%	-5%
April	+6%	0
May	-28%	+1%

Veterans Cab did not compile statistics to examine the effect of Night Ride on its exclusive-ride operation at night and was not concerned about losing nighttime ridership. (In fact, Veterans seemed disappointed in the low-level of marketing of Night Ride by the AATA.). While initially it claimed that riders denied service on Night Ride called Yellow Cab for exclusive-ride service, by the end of the demonstration Veterans Cab believed that daytime exclusive-ride taxi ridership had gone up as a result of Night Ride.

6.4.3 Issues of Risk Distribution

One of the key aspects of the AATA Night Ride contract was the establishment of a fixed subsidy per hour based on an expected ridership. The contract thus fixed AATA's cost, insofar as vehicle-hours remained fixed. It also shifted the risk associated with low ridership to the contracting taxi firm. If fewer passengers used the service than anticipated, the loss in revenue would be a loss for the taxi company, while the AATA would be unaffected (at least for the term of the contract). By the same token, if ridership proved higher than expected (within the limits of the service provided), the taxicab company would reap additional profit. This encouraged the taxi cab company to maximize productivity through ride-matching.

In fact, ridership productivity proved to be lower than initially estimated and the taxi cab company received a lower revenue than expected for the first year; after that time, a higher subsidy was requested and approved, based on a productivity which better reflected the actual experience. However, productivity subsequently increased to levels approaching the original estimate.



7. CONCLUSIONS

7.1 VIABILITY OF LATE NIGHT SHARED-RIDE TAXI

The concept of late-night shared-ride taxi has proven viable in Ann Arbor. Ridership grew over the demonstration period and, except for seasonal variation, the increases were sustained over time. Enough riders were attracted to require the taxi company to add additional vehicles. Although there is little comparable late-night experience, Night Ride's productivity was nearly as high as those of daytime shared-ride taxi services in some areas. The productivity increased over time to levels approaching the fairly optimistic projections of the cab company that won the contract.

Thus, the AATA has been able to offer a needed service at a subsidy that it can afford and which is easy to estimate for budgeting purposes. The per passenger subsidy for Night Ride actually proved to be lower than that for Ann Arbor's general public evening and Sunday dial-a-ride service, despite the lower demand levels at night.

7.2 DESIGN AND IMPLEMENTATION

AATA designed Night Ride to be easy to implement, budget, monitor and use. It therefore opted for dedicated vehicles with a fixed subsidy per hour. Fares were to be retained by the operator as an incentive to increase productivity. AATA felt that this was the safest option given its lack of experience in both nighttime transportation and contracting with private operators. At the same time, it built some flexibility into the contract to enable the AATA to change the service based on experience.

Implementation of Night Ride service proceeded fairly smoothly. The fact that only one taxi company was providing Night Ride probably contributed to the ease of implementation, despite the AATA's earlier expectation that the reverse would

be true. Furthermore, the losing bidder was in support of contract service, in general, as a means of providing low cost transit service and shoring up taxi companies in an era of increasing costs and declining ridership.

The AATA unions recognized the social benefits of Night Ride and were aligned with the service's proponents. According to the AATA, the union did not voice opposition to the AATA's decision to contract with a private operator since the AATA did not previously operate any service during late-night hours, and since it was clear that the service would not be economically acceptable to the AATA Board if it were provided with AATA labor.

As expected, changes did occur over the course of the demonstration in: number of vehicles in service, start times, procedures and subsidy level. However, because many service parameters were relatively fixed for most of the demonstration period, Night Ride had difficulty in responding in the short term to periods of high demand and low demand; this resulted in some very long wait times, as well as a lower productivity than might have been achieved. Of course, the AATA's priority was a low and fixed cost of subsidy and not service levels approaching that of exclusive-ride taxi. The AATA has been addressing the problem of occasional high demands since the demonstration concluded.

7.3 USER PERCEPTIONS OF SERVICE QUALITY

Night Ride was well received by its riders, and the overall quality of service was considered "good" by the average respondent to user surveys. Wait time has probably been the most significant problem with Night Ride; it has averaged in the 17-22 minute range for most of the demonstration, but on occasion passengers have had to wait up to two and one-half hours. Accordingly, wait time was a frequent source of complaints in the user survey, with 27% of the respondents indicating that shorter wait times were needed and another 8% indicating more vehicles were needed.

In order to reduce the long wait times which it believed were due in part to delays in starting service, the taxi operator was urged by the AATA to get Night Ride started promptly at 11 p.m. As indicated earlier, greater flexibility on the part of the operator to adjust the number of vehicles to nightly demand for service might have also reduced wait time. Although the AATA approved changes in the fixed number of vehicles several times during the demonstration and allowed the operator some flexibility in the 11 p.m. to midnight hour, greater operator flexibility began at the end of the demonstration.

7.4 SAFETY IMPACTS

The primary impetus for the implementation of Night Ride was the lack of safety on the streets at night, particularly for young women. Surveys conducted before implementation confirmed the view that safety would be the primary reason for using the service for university students and hospital workers. However, surveys of a representative group of actual riders revealed that safety was not the primary reason for use of Night Ride and that the service had found a substantial market due to its low fare (i.e., price advantage over exclusive-ride taxi).

While the service was designed to protect passengers from assault on the streets and was primarily oriented toward women, it attracted 35-40% male passengers. Some female passengers felt that the male passengers should be dropped off first so the females' addresses would not be revealed. Legally, the AATA could not guarantee such a procedure. The service also required strangers to share a small vehicle; however, for most passengers this did not seem to be a problem.

The incidence of assaults on women could not be used as a basis for evaluating the demonstration's success; this is due to concerns about the reliability of this information and changes in the degree and manner of reporting, as well as variation in the small numbers of reported incidents that might be due to other factors or random effects. On the other hand, the availability of Night Ride was welcomed by women's groups and security forces, and that in itself suggests a perceived benefit to the community.

7.5 RIDERSHIP

Ridership on Night Ride grew substantially over the course of the project reaching 2339 riders per month at the end of the demonstration when service hours were also expanded. During the one year period from October 1982 to October 1983, ridership grew by 26%. The ridership consisted, for the most part, of occasional riders. AATA was quite satisfied that the riders varied since it indicated that the service was useful to a large number of residents and consequently could develop a broad base of support. The fact that Ann Arbor is a university community probably had a significant impact on the quantity of ridership and its seasonality, but it is important to note that about half the riders were full time employees, many of whom were traveling to or from work. In fact, ridership by university students was less extensive than had been expected.

7.6 TRAVEL BEHAVIOR

Surprisingly, the primary reason for using Night Ride was not safety, but low cost, according to results of a survey of riders. Perhaps, this is because many respondents did not consider walking a viable alternative since they were traveling long distances. Night Ride's flat fare compared to distance-based exclusive-ride taxi fares made it a greater bargain for those traveling longer distances, although some longer trips were rather circuitous and slow. Had the Night Ride fare been distance-based, the distribution of user travel distances and the reasons for using Night Ride might have been different.

The fact that safety was not the primary reason for using Night Ride raises questions about the its success in meeting its objective; it was originally suspected that Night Ride would primarily divert trips from walking and serve latent demand (i.e, trips that were not being made or were made earlier due to fear about street crime). The data does not indicate that this was often the case. Although most of the students in a follow-up panel survey did indicate that safety was their primary reason for using Night Ride, the surveys were probably conducted too soon after the service was initiated to provide really useful information on how many students did not use the service and why they did not.

As many as one half of the Night Ride users usually had a vehicle alternative available for their nighttime trips. Thus, Night Ride had a substantial number of riders who either chose to use Night Ride or had a temporary problem with their vehicle (i.e., their car broke down or was needed by another household member). In fact, for most, the latter was the case. Thus, a large proportion of riders were usually automobile travelers. However, when asked what their alternative would be if Night Ride were unavailable, the overwhelmingly majority indicated regular taxi. This may imply that many Night Ride passengers were actually diverted from taxis on the night in question, despite the fact that taxi was not their usual mode; for some others, Night Ride may have introduced the taxi mode as a potential alternative, where it had not been previously considered.

7.7 COSTS TO THE SPONSOR AGENCY

The AATA designed the contract with the taxi operator so that its subsidy costs would be fixed over the budgetary period. This was an important aspect of the project, since Night Ride was a new service and was directed at a relatively unknown market. The AATA clearly wanted to avoid spending a large and variable amount of its budget on late-night service. In fact, the costs of Night Ride proved to be quite reasonable

when compared with those of evening dial-a-ride. For example, the subsidy per passenger on Night Ride was only \$2.15 compared to \$4.79 on general public (evening and Sunday) dial-a-ride. The user share of total operating cost of Night Ride was 43%, much higher than that of other AATA services. The AATA spent \$33,184 to operate Night Ride in FY 1983; in relation to the AATA system as a whole, this is 0.5% of its total budget to carry 0.5% of its total passengers.

7.8 OPERATOR ISSUES

The AATA left the projection of ridership demand up to the taxi companies, assuming that they had the most experience with and information about late-night travel in Ann Arbor. The initial bid by Veterans Cab assumed a productivity of 4.5 passengers per vehicle hour, considerably above that which was experienced in the first year (although only 8-10% above the maximum productivity experienced in the last few months of the demonstration).

Although the resulting revenue did not meet the taxi operator's expectation, the operator reportedly did not suffer any significant deficit during the first year of operation. In the second year, the subsidy was increased from \$6.00 to \$7.50 per vehicle hour to make up for the lower productivity. However, since productivity subsequently increased (reaching a high of 4.2 during at least one month), the resulting revenues per vehicle hour exceeded those assumed in the original bid, even allowing for inflation. As a result, profitability of Night Ride on a monthly basis was greatly increased.

7.9 INFLUENCE OF SITE SPECIFIC FACTORS ON RESULTS

Several characteristics of Ann Arbor and of this project's design are likely to have influenced the results of the demonstration and may limit the transferability of the results. These include:

1. the university setting,
2. the existence of evening dial-a-ride,
3. the mode of operation of the taxi companies,
4. Ann Arbor's climate,
5. crime and safety issues.

The university had a number of influences on the project. The level of nighttime travel in Ann Arbor is in part a result of the university, due both to activities it offers and the fact that it swells Ann Arbor's population in age groups that are most likely to travel at night. The university colors Ann Arbor's politics and its cultural atmosphere making Ann Arbor somewhat different from other cities of the same size. Despite

the fact that about half of the Night Ride users were full-time workers, it is easy to imagine that other cities without a university would have a lesser demand for a nighttime taxi service.

The existence of evening dial-a-ride served as a natural bridge between daytime fixed-route transit and Night Ride. Its existence may have encouraged residents to consider the idea of sharing a small vehicle in door-to-door service. In communities without such service, it is possible that Night Ride might not have caught on so quickly.

Ann Arbor's cold winter climate probably did not influence ridership to a great degree; indications are that the weather conditions were of secondary importance in the mode choice decisions. Although ridership was higher in winter months, analysis indicated that school sessions had a much greater influence than cold weather. Furthermore, many riders used Night Ride as an alternative to other vehicle modes rather than an alternative to walking, and passengers indicated that weather protection was not a key reason for their use of Night Ride.

Several incidents raised the consciousness of the community with regard to the safety of women traveling in nighttime hours. Had these incidents not occurred and had the community not reacted strongly to this issue, Night Ride would most likely not have been implemented. On the other hand, since so few passengers indicated that their primary reason for using Night Ride was safety, one might conclude that once the service was initiated, Ann Arbor's safety and crime environment had little to do with the project's success.

In summary, site-specific factors contributed to Night Ride's successful implementation, and played a role in its ability to attract riders. For the most part, however, one would attribute its success to the service design and the availability of nighttime travel demand. This suggests that once the initial barriers to implementation are overcome, similar services should be successful in other cities where there is demand for nighttime travel and a substantial daytime transit ridership.

APPENDIX A

BEFORE AND FOLLOW-UP SURVEYS

This appendix provides detailed discussion of the "before" and "follow-up" surveys which were alluded to in the report.

A.1 Description of the Before Survey Effort

The purpose of the survey effort was to assess the impact of the new "Night Ride" service on the late-night travel behavior of Ann Arbor residents. A "before" round of surveying was designed to collect data on how individuals traveled before introduction of the Night Ride service.

Four survey forms were used to collect the necessary "before" data.

1. General University Surveys: These were mailed to a selected sample of 3000 University of Michigan students.
2. Activity Center (Facility) Surveys: These were distributed for two evenings in a central location at the graduate and undergraduate libraries and at the North Campus computing center.
3. Hospital Surveys: These were distributed in the cafeteria for one day during all three employee lunch periods.
4. On-Board Passenger Surveys: These were distributed for two evenings to passengers on the evening Dial-A-Ride service.*

Initial surveying took place on Wednesday, March 10 and Thursday, March 11. It extended from 7 p.m. until closing time at the libraries, from 7 p.m. until 6 a.m. at the computing center, during lunch periods on all three shifts at the hospital (roughly 11:30 a.m.-1:30 p.m., 7-9 p.m., and 2:30-4:30 a.m.), and from 7:15 p.m. until the end of service on the Dial-A-Ride system.

A.2 Description of the Follow-up Survey Effort

The follow-up survey was conducted on April 12. It consisted of a mailback questionnaire mailed to those individuals in the general university and facility samples who agreed to participate in a follow-up. Although the service had

* Note that the originally planned fixed-route survey never took place.

been in operation for only one month, it was necessary to perform the follow-up survey for these student groups before the end of the school year. Originally, plans called for the remaining population segments to receive follow-up surveys in the fall; however, the "before" sample sizes of these groups were too small to justify a follow-up survey .

A.3 Sample Sizes and Response Rates

Table A-1 summarizes the sample sizes obtained in the before and follow-up surveys. The response rate to the facility survey, estimated from the count of facility users during the survey period, was nearly 20%. The response rate to the general university survey was even higher, nearly 30%, although surveys were mailed to only 10% of the student population yielding a 3% sample. The sample sizes are adequate for the analysis of all but the dial-a-ride sample, although the hospital survey would not permit estimates of proportions within (95%) confidence intervals of less than + 7.5% (based on a true proportion of 20%). In contrast, the follow-up sample permits estimation of proportions within intervals as small as + 4%. (These estimates assume infinite populations). It should be noted, however, that since the number of users was small, the results of the follow-up survey for the user subgroup are subject to considerable uncertainty. Potential biases in the samples are investigated in the next section.

A.4 Results of the "Before" Surveys

Representativeness of the Samples

Table A-2 summarizes socio-economic characteristics of the samples and some comparative data obtained from other sources. Due to the lack of detailed statistics on the target populations, only limited comparisons may be made with survey statistics. Nevertheless, it appears from the available data that our samples are representative of the populations in several key respects.

The survey samples reflect the gender characteristics of the population; only the general university sample seems to be somewhat biased toward females. The age distribution also appears to be in accordance with the age characteristics typical of university target groups; that is, the overwhelming portions of both the general university and facility samples are in the age 16-24 range and much of the remainder in the age 25-34 range. The other samples exhibit a wider age distribution, as expected. The hospital survey sample is primarily within the age 25-44 range, with a substantial number under age 25 as well. Nearly 90% of the dial-a-ride sample is between the ages of 16 and 44, with a large portion under 25. Note that other AATA surveys conducted on-board the fixed-route

Table A-1. SAMPLE SIZES

	<u>Before Survey</u>				<u>Follow-Up</u>
	Gen. Univ.	Facility	Hospital	Dial-A-Ride	(Gen. Univ. & Facility)
# of respondents	999	843	102	48	488
Population size	33,200	4,296	5,250	340	978
% sample	3.0%	19.6%	1.9%	14.1%	49.9%
Breakdown of respondents:*					
(Potential) Users	50.4%	53.9%	64.3%	86.4%	8.2%
Non-Users	49.6%	46.1%	35.7%	13.6%	91.8%

* Excludes those who made no nighttime trips.

Table A-2. REPRESENTATIVENESS OF THE SAMPLE

	SURVEYS (1982)		TARGET POPULATION					AATA SURVEY (1981)
	GENERAL UNIVERSITY	FACILITIES HOSPITAL	DIAL-A-RIDE	UNIVERSITY STATISTICS (1982)	HOSPITAL STATISTICS (1982)	AATA TELTRAN (1975)	AATA TELEPHONE SURVEY (1981)	
SEX:								
male	48.2	57.5	34.4	43.8	na	na	49.5	40
female	51.8	42.5	65.6	56.3	38.2	na	50.5	60
AGE:								
under 16	0	0.2	0	4.3	na	20	under	13
16-24	78.8	85.5	23.7	48.9	na	40	18-34	66
25-44	20.8	13.5	70.1	40.4	na	24	35-55	15
45-64	0.2	0.7	6.2	4.3	na	7	55 and over	6
65 and over	0.2	0	0	2.1	na	4	over	
INCOME:								
under 10K	26.0	18.6	16.7	43.2	na	na	under	51
10-19K	14.0	10.4	37.8	29.5	na	na	12K	26
20-29K	12.3	11.9	26.7	11.4	na	na	12-20K	17
30-39K	12.5	15.3	14.4	2.3	na	na	20-40K	6
40-49K	10.4	11.4	2.2	9.1	na	na	40 and over	
50K and over	24.8	32.4	2.2	4.5	na	na	8.2	0
Missing	8.4	13.3	11.8	8.3	na	na		
STATUS:								
Student	100	100	na	48.8	na	na	21	44
Full-time employed	na	na	na	41.9	na	na	60	40
Homemaker	na	na	na	na	na	na	6	4
Retired	na	na	na	na	na	na	7	3
Other	na	na	na	na	na	na	6	9
STUDENT BREAKDOWN:								
Full-time	92.4	91.6	na	na	79.8	na	na	na
Undergraduate	63.4	77.8	na	na	na	na	na	na
Graduate	29.0	13.8	na	na	na	na	na	na
Part-time	3.8	1.9	na	na	20.2	na	na	na
Undergraduate	2.2	1.4	na	na	na	na	na	na
Graduate	1.6	0.5	na	na	na	na	na	na

(cont'd)

Table A-2. REPRESENTATIVENESS OF THE SAMPLE (Continued)

	SURVEYS (1982)		TARGET POPULATION				
	GENERAL UNIVERSITY FACILITIES	HOSPITAL DIAL-A-RIDE	UNIVERSITY STATISTICS (1982)	HOSPITAL STATISTICS (1982)	ATA TELTRAN (1975)	ATA TELEPHONE SURVEY (1981)	ATA FIXED ROUTE ON-BOARD SURVEY (1981)
<u>WORKER BREAKDOWN:</u>							
(hospital only)		*					
Nurses		20.0		18.1			
House officers		15.0		9.2			
Technicians		12.5		11.4			
Tradespeople		1.2		1.6			
Services & Maint.		12.5		17.8			
Profess. and Admin.		26.3		25.2			
Office		12.5		16.7			

* excludes medical and other categories

service in 1981 indicated ridership even more skewed to the younger age groups, although a concurrent telephone survey of area residents showed a somewhat more moderate skewing than the fixed-route sample. A 1975 survey of dial-a-ride and fixed-route riders showed an even greater portion of the ridership under 16 years of age, roughly in accordance with 1970 Census data on Ann Arbor residents. Thus, there may be a slight bias in our samples toward the university age group.

The hospital sample is remarkably similar in the distribution of employment categories to the distribution derived from hospital records. Apparent discrepancies may be due to the subject matter of the survey, which could have biased the sample to night shift employees.

As might be expected, hospital workers exhibited the greatest degree of automobile availability (as driver or passenger), while dial-a-ride users exhibited the least (see Table A-3).

Nighttime Trip Rates

The average respondent to the general university survey makes 8.8 nighttime trips per week (3.5 in vehicles), however there is a large variance about this average (see Table A-4). Dial-a-ride users make fewer trips than other respondents, averaging only 2.2 nighttime trips per week. Presumably, this is because dial-a-ride users have fewer options for night travel than individuals in the other sample groups. Despite the large variances, differences in trip rates among the survey groups are significant at the 95% confidence level.

Mode Distribution of Nighttime Trips

The most popular nighttime travel modes are walking and driving an automobile (see Table A-5). As might be expected, driving is the primary mode of travel for hospital workers, while for the general university and facility respondents (many of whom are students who live on campus), walking alone or with others is the primary mode. There is a greater distribution of travel modes among dial-a-ride users.

Desired Attributes of Nighttime Travel Modes

Safety and low cost were the most important attributes of any mode for nighttime travel according to the surveys (see Table A-6). Safety was the primary concern among all but the dial-a-ride users. It was clearly the paramount concern among the hospital workers, who are largely female. However, among the dial-a-ride users (who have the lowest incomes among the survey samples), low cost was the overriding concern and was

Table A-3. VEHICLE AVAILABILITY

	Percent of Respondents who can use:			
	Gen. Univ.	Facility	Hospital	Dial-A-Ride
Auto (Driver)	45.1	31.0	66.7	25.5
Auto (Pass.)	22.3	10.6	28.4	17.0
Bicycle	33.6	22.8	38.2	38.3
Motorcycle/Moped	2.0	0.6	2.0	4.3
None of the Above	33.2	51.5	15.7	42.6

Table A-4. NIGHTTIME TRAVEL

a) ONE-WAY TRIPS PER WEEK					
	Mean (standard deviation)				
	Gen. Univ.	Facility	Hospital	Dial-A-Ride	Follow-Up
Total Trips	8.8 (13.3)	10.0 (12.9)	6.7 (8.8)	2.2 (2.9)	8.0 (11.4)
Vehicular Trips	3.5 (6.1)	3.6 (8.3)	5.4 (7.0)	1.3 (2.3)	3.3 (5.3)
# Observations	961	806	95	29	480

b) MAIN TRIP PURPOSE

	Percent of Respondents Going To/Coming From:				
	Gen. Univ.	Facility	Hospital	Dial-A-Ride	Follow-Up
Work	6.7	5.6	--	29.4	10.5
Study	50.5	68.4	--	26.5	50.6
Other	42.8	26.0	--	44.1	38.9

Table A-5. MODE DISTRIBUTION OF TRIPS AT NIGHT

	Mean (standard deviation)									
	Gen. Univ.		Facility		Hospital		Dial-A-Ride		Follow-Up	
Drive	22.1	(34.4)	17.6	(32.3)	56.2	(42.6)	28.2	(45.2)	22.3	(34.1)
Ride	12.3	(25.0)	7.5	(16.8)	18.7	(30.5)	12.1	(28.0)	12.8	(23.7)
University Bus	7.7	(21.6)	9.8	(24.4)	0.6	(3.6)	0.0	(0.0)	6.2	(18.0)
Taxi	3.1	(14.0)	2.4	(10.8)	5.0	(19.0)	12.4	(30.3)	1.5	(7.6)
Walk Alone	31.7	(34.8)	39.5	(36.0)	13.0	(27.8)	29.1	(43.5)	28.5	(32.7)
Walk w/Others	20.9	(29.6)	21.0	(28.0)	2.1	(9.5)	9.1	(29.4)	22.4	(29.6)
Bike	0.7	(5.9)	0.7	(5.7)	1.3	(6.9)	4.5	(21.3)	3.7	(14.5)
Motorcycle/ Moped	0.0	(1.1)	0.2	(4.0)	0.0	(0.0)	0.0	(0.0)	0.5	(5.5)
Other	1.4	(8.2)	1.3	(10.1)	3.0	(12.2)	4.5	(21.3)	0.1	(1.1)
# Observations	852		763		74		22		440	

Table A-6. PRIMARY ATTRIBUTE FOR NIGHT TRAVEL

	Percent of Respondents Indicating:			
	Gen. Univ.	Facility	Hospital	Dial-A-Ride
Low Cost	22.3	28.0	19.5	45.5
Short Travel Time	27.6	27.6	10.3	6.8
Weather Protection	8.7	8.5	8.0	15.9
Safety	41.4	35.9	62.1	31.8

much more important than short travel time. (For other respondents, cost and short travel time were similar in importance.) Fare for night-ride service should undoubtedly have a significant impact on the degree to which latent nighttime travel demand among evening dial-a-ride users is realized.

Potential Use of Night Ride Taxi Service

The surveys indicate that hospital workers and evening dial-a-ride users would make the greatest percentage (over half) of their trips on the Night Ride taxi service (see Table A-7). It should be noted, however, that the sample sizes of these survey groups are small and the results are therefore subject to the greatest degree of uncertainty. Furthermore, the sizes of these populations are small compared to the university student population. As a result, students may make up the largest portion of potential users. On average, the respondents to the general university and facility surveys indicated that they would make about one quarter of their current nighttime trips on Night Ride taxi. Evening dial-a-ride users have a lower total nighttime trip rate on average than the other survey respondent groups, and were most likely to indicate that Night Ride taxi would increase their tripmaking and allow them to travel later at night (see Table A-8). Dial-a-ride users were more likely than others to divert their trips from "getting rides from others" (see Table A-9).

Factors Influencing Potential Use of Night Ride Taxi

Crosstabulations were performed to investigate the correlation between potential use of Night Ride taxi (as a percentage of current nighttime trips) and factors such as sex, age, income, residential location and current mode use. In all survey samples, females were more likely than males to indicate use of Night Ride. Females were also significantly more likely than males to be primarily concerned about safety. While low income, concerns about safety and short travel times, and current use of taxis and rides from others all appeared to exhibit a correlation with potential use of Night Ride in some samples, tests of significance (i.e., chi-square, Cramer's V and Lambda) did not confirm these apparent correlations.

A.5 Results of the Follow-Up Survey

The follow-up survey included individuals in the general university and facility samples who agreed to participate in a panel. Cross-tabulations in the before surveys did not indicate that their consent was correlated with key characteristics.

Table A-7. (POTENTIAL) USE OF NIGHT RIDE

	Mean (standard deviation)				
	Gen. Univ.	Facility	Hospital	Dial-A-Ride	Follow-Up
% of Current Night Trips ¹	26.9 (54.0)	22.6 (42.6)	58.3 (130.8)	116.8 (128.7)	2.1 (11.4)
# Observations	832	738	70	22	440

¹ While current nighttime trips and future trips by Night Ride are compared in this measure, they were not explicitly tied together in the survey questions; as a result the measure may exceed 100%.

Table A-8. (POTENTIAL) IMPACT OF NIGHT RIDE

	Percent of Respondents Indicating:				
	Gen. Univ.	Facility	Hospital	Dial-A-Ride	Follow-Up
Travel Later	38.3	36.7	36.7	71.0	55.6
Travel to Different Locations	28.4	29.8	24.4	36.7	52.9
Increase Trips	41.3	38.4	33.3	71.9	47.1

Table A-9. POTENTIAL OR ACTUAL DIVERSION

	Percent of Respondents from:				
	Gen. Univ.	Facility	Hospital	Dial-A-Ride	Follow-Up
Drive	23.0	14.0	49.5	22.9	6.7
Get Ride	18.1	13.5	23.2	42.9	33.3
University Bus	12.2	13.0	1.0	8.6	13.3
Taxi	9.2	7.6	9.1	25.7	53.3
Walk Alone	33.3	41.1	14.1	37.1	66.7
Walk w/Others	27.8	25.9	5.1	14.3	40.0
Bicycle	5.0	3.8	3.0	14.3	0.0
Motorcycle/Moped	0.3	0.2	0.0	2.9	0.0
Other	0.0	0.0	0.0	0.0	13.3

% induced trips (no previous mode)	4.8	2.3	8.6	18.2	13.3

Use of Night Ride

Of the nearly 500 persons in the follow-up survey, only 15 or 3% had used Night Ride more than once, while 25 or 5% had used the service just once. Note that AATA has estimated that about 1000 (unduplicated) individuals have been using Night Ride, only about 50 of which are doing so regularly. Thus our user sample of 40 represents approximately 4% of all users and probably somewhat less than 20% of regular users.

The follow-up group as a whole (largely non-users) made 8.0 trips per week after 11 p.m., 22.3% as auto drivers. The average regular Night Ride user in the follow-up sample made 9.4 trips per week after 11 p.m., with 43% of their trips on Night Ride and only 5.8% as an auto driver. However, these apparent differences between the users and non-users do not stand up to statistical tests due to the small sample of users.

Impact of Night Ride

Approximately 60% of the regular users of Night Ride indicated it allows them to travel later, to different locations and to make more trips. These are higher percentages than were found in the "before" surveys. Safety was the primary reason for using Night Ride; low cost was another key reason.

Diversion from Other Modes

As might be expected, few users of Night Ride were diverted from the "drive" mode. The primary modes from which they were diverted were (in order of importance) walking alone, taxi, walking with others and getting a ride (see Table A-10). Presumably, safety and cost considerations have made Night Ride an attractive alternative to the first two modes (see Table A-11).

Before/After Comparison of Night Ride Users

The majority of the users in the follow-up sample were female (73%) and indicated that their main reason for using Night Ride was concern for safety (73%). These individuals used Night Ride for an average of 37% of their nighttime trips (although the range was from 100% to nearly 0%). These individuals had formerly predicted that they would make an average of 60% of their trips on Night Ride. Only 58% of the predicted trips were made, however. On average, these users did not change their total trip rate after Night Ride was in service, despite the large percent who indicated they would (in the before survey).

Table A-10. PREVIOUS MODE FOR NIGHT RIDE TRIPS

Percent of Respondents Indicating:

	<u>Follow-Up</u>
Drove	6.7
Got a ride	33.3
University bus	13.3
Taxi	53.3
Walked alone	66.7
Walked with others	40.0
Bicycle	0
Motorcycle/Moped	0
Used other means	13.3
Did not make the trip	13.3

Table A-11. PRIMARY REASON FOR USING NIGHT RIDE

Percent of Respondents Indicating:

	<u>Follow-Up</u>
Low cost	36.7%
Short travel time	0%
Weather protection	6.7%
Safety	60.0%
Other	6.7%

Reasons for Not Using Night Ride

The majority of the respondents who have not used Night Ride indicated that the reason was that they have other travel means (see Table A-12). Another large segment reported that they do not travel after 11 p.m. For those who indicated level of service reasons for not using Night Ride, expense was slightly more important than wait time (travel time was even less important).

Table A-12. REASONS FOR NOT USING NIGHT RIDE

Percent of Respondents Indicating:	
	<u>Follow-Up</u>
Don't travel after 11	31.1
Have other means	54.8
Only use in bad weather	9.2
Too expensive	18.6
Wait too long	13.2
Travel time too long	6.4
Other	29.0

Potential for Increasing Use of Night Ride

The primary factor which could influence non-users to use Night Ride was increased nighttime travel needs. Another group of non-users identified the key factor as weather conditions at the time of the trip. Together these two groups make up almost half of the non-users. Another 20% were not interested in the service at all. Of the 19% who indicated a particular service attribute as the key influential factor, almost two-thirds specified "lower cost." These results suggest limited potential for increasing use of Night Ride among non-users.

Users of the service (both one-time and regular) were equally (or more) likely to indicate that their travel on Night Ride would be most influenced by shorter wait time as by lower cost, although a larger number indicated that external factors such as need to travel and weather conditions were the most important factors. The fact that cost and wait time were equally important constrains the ability to influence ridership through service changes.

A.6 Conclusions

It is difficult to draw definitive conclusions about the users of Night Ride since the follow-up survey of university students included only 15 individuals who had used Night Ride.

The before survey appears to have obtained a representative group of the student, hospital and dial-a-ride populations, although the dial-a-ride sample is very small. The three groups differ substantially in their travel habits due to their varying incomes, employment/student status and residential location (most students live on campus, near their primary destinations). As a result, their nighttime trip rates and mode choices vary, as well as their criteria for selection of a mode alternative. Thus, they represent distinct target markets. Nevertheless, there was some similarity in how nighttime travel mode choices are made: typically, safety and low cost were the most important service attributes.

The follow-up survey showed that few riders were diverted from the "drive" mode; most previously walked, used a taxi or rode with others. The majority of users indicated that the service had beneficial impacts on their nighttime travel. While some non-users would be induced to use Night Ride if the fare were reduced, an improvement in wait times would be equally or more influential among users.

The key differences between the results of the follow-up survey and the before survey were that users made an average of only 37% of their nighttime trips on Night Ride as compared to a predicted 60% and that the total trip rates of users were largely unchanged despite predictions by a large percent that they would increase their trips.

GENERAL UNIVERSITY "BEFORE" SURVEY

For office use only

1 Form
2-5 I.D.
6-8 Date

For office use only

Date _____

Night Transportation Survey

The Ann Arbor Transportation Authority is conducting a survey of travel during the evening and late night hours. We are interested in how people travel, as well as their attitudes and preferences regarding various means of travel which they have available. Please help us by completing this brief survey form.

9 **1** Do you live on the university campus?

- 1 Yes, on the Central Campus → Go To Q. 3
- 2 Yes, on the North Campus → Go To Q. 3
- 3 No

10-11 **2**

Below is a map of the City of Ann Arbor, divided into zones that correspond to the zones used by the general public Dial-A-Ride service. Please look at the map and indicate the name of the zone in which your residence is located.

- 1 Liberty
- 2 Miller
- 3 Packard
- 4 Plymouth
- 5 Pontiac
- 6 Washtenaw
- 7 I do not live within the City limits. I live in: _____ (please specify)



3 How do you generally travel to locations on the Central Campus? (Check one.)

- 1 Drive a car
- 2 Get a ride from someone
- 3 Take the university shuttle bus
- 4 Take the Dial-a-Ride service
- 5 Take the AATA fixed-route bus
- 6 Take a taxi
- 7 Walk alone
- 8 Walk with other person(s)
- 9 Ride a bicycle
- 10 Ride a motorcycle or moped
- 11 Other _____ (please specify)

12-13

4 How do you generally travel when you return from locations on the Central Campus? (Check one.)

- 1 Drive a car
- 2 Get a ride
- 3 Take the university shuttle bus
- 4 Take the Dial-a-Ride service
- 5 Take the AATA fixed-route bus
- 6 Take a taxi
- 7 Walk alone
- 8 Walk with other person(s)
- 9 Ride a bicycle
- 10 Ride a motorcycle or moped
- 11 Other _____ (please specify)

14-15

5 Which of these vehicles are generally available for your use? (Check all that apply.)

- 1 Automobile (driver)
- 2 Automobile (passenger)
- 3 Bicycle
- 4 Motorcycle/Moped
- 5 None of the above

16
17
18
19
20

6 During the past seven days, how many one-way trips within the city limits of Ann Arbor did you make between 11 p.m. and 6 a.m. by each of the following ways of traveling? (A one-way trip is any travel between two points. For example, travel from home to work is one trip, and travel from work back to home is a second trip.)

- a. By driving a car: _____ trips
- b. By getting a ride from someone else: _____ trips
- c. By the university shuttle bus: _____ trips
- d. By taxi: _____ trips
- e. By walking alone: _____ trips
- f. By walking with other person(s): _____ trips
- g. By bicycle: _____ trips
- h. By motorcycle or moped: _____ trips
- i. By other means _____ (please specify) : _____ trips

21-22
23-24
25-26
27-28
29-30
31-32
33-34
35-36
37-38

39 **7** What is your main purpose when you travel between 11 p.m. and 6 a.m.? (Check one.)

- 1 Work
- 2 Study
- 3 Other

40 **8** How important is each of these characteristics in your decision of how to travel at night? (Please rank in order of importance from 1 to 4, using 1 for the most important characteristic.)

- 41 Low cost
- 42 Short travel time
- 43 Protection from the weather
- 44 Safety

46 **9** The Ann Arbor Transportation Authority is planning to provide a door-to-door shared-ride taxi service called "Night Ride" within the city limits of Ann Arbor between 11 p.m. and 6 a.m. for a fare of _____.

47 **9A.** In an average week, how many one-way trips do you think you will make using Night Ride? _____ (Please indicate number of trips)

48 **9B.** How do you now make the trips that you plan to make on Night Ride? (Check all that apply.)

- 49 1 By driving a car
- 50 2 By getting a ride
- 51 3 By taking the university shuttle bus
- 52 4 By taking a regular taxi
- 53 5 By walking alone
- 54 6 By walking with other person(s)
- 55 7 By riding a bicycle
- 56 8 By riding a motorcycle or moped
- 57 9 I do not plan to use Night Ride. _____ Go To Q.10

58 **9C.** When Night Ride begins, will you...?

- | | | | | | |
|----|-----|--------------------------|------------|--------------------------|---|
| 59 | Yes | <input type="checkbox"/> | Don't Know | <input type="checkbox"/> | a. Travel later at night than you do now? |
| 60 | No | <input type="checkbox"/> | | | b. Make your trips after 11 p.m. to different locations? |
| 61 | | <input type="checkbox"/> | | | c. Increase the total number of trips you make after 11 p.m.? |

59 **10** Please indicate which of the following best applies to you. (Check one.)

- 1 Full-time undergraduate student
- 2 Part-time undergraduate student
- 3 Full-time graduate student
- 4 Part-time graduate student
- 5 Faculty member
- 6 Staff member
- 7 Other _____ (please specify)

60 The following questions are necessary for statistical purposes. Information provided will remain strictly confidential.

61 **11** Are you?

- 1 Male
- 2 Female

62 **12** What is your age?

- 1 Under 16
- 2 16-24
- 3 25-44
- 4 45-64
- 5 65 or over

63 **13** What is the combined annual income of all of the members of your household? (Undergraduates indicate family income category.)

- 1 Less than \$10,000
- 2 \$10,000-\$19,999
- 3 \$20,000-\$29,999
- 4 \$30,000-\$39,999
- 5 \$40,000-\$49,999
- 6 \$50,000 or more

64 **14** WE WILL BE DOING A SECOND SURVEY AFTER "NIGHT RIDE" BEGINS. IT WOULD BE VERY HELPFUL TO US IF YOU WOULD AGREE TO PARTICIPATE IN THIS SECOND SURVEY.

IF YOU WOULD BE WILLING TO ANSWER THE SECOND SURVEY, PLEASE INDICATE YOUR NAME, ADDRESS AND TELEPHONE NUMBER BELOW. THANK YOU FOR YOUR HELP.

NAME _____

ADDRESS _____

PHONE NUMBER _____ (days) _____ (evenings)

SUGGESTED DAYS OF THE WEEK AND TIMES TO CALL _____

FACILITY "BEFORE" SURVEY

For office use only
1 Form
2-5 I.D.
6-9 Date
10-13 Time
14 Facility

Date I.D. No.
Time
Facility: Computing Center Graduate Library Undergraduate Library

Night Transportation Survey

The Ann Arbor Transportation Authority is conducting a survey of travel during the evening and late night hours. We are interested in how people travel, as well as their attitudes and preferences regarding various means of travel. Please help us by completing this brief survey form.

HAVE YOU PREVIOUSLY COMPLETED AND RETURNED A NIGHT TRANSPORTATION SURVEY?

- 15 No Yes Where did you receive the previous survey?
16 By mail University Hospital
Undergraduate Library Dial-A-Ride
Graduate Library Regular AATA fixed-route bus

If you completed and returned the previous survey, please complete only the above information and return this form to the surveyor. Thank you.

- 17 What time did you arrive at this building?
1 Before 7 p.m.
2 7:01-10 p.m.
3 10:01-11 p.m.
4 11:01 p.m.-12 midnight
5 12:01-1 a.m.
6 1:01-2 a.m.
7 2:01 a.m. or later

- 18-19 How did you travel here? (Check one.)
1 Drove a car
2 Got a ride from someone
3 Took the university shuttle bus
4 Took the Dial-a-Ride service
5 Took the AATA fixed-route bus
6 Took a taxi
7 Walked alone
8 Walked with other person(s)
9 Rode a bicycle
10 Rode a motorcycle or moped
11 Other (please specify)

- 20 What time do you plan to leave this building?
1 Before 10 p.m.
2 10:01-11 p.m.
3 11:01 p.m.-12 midnight
4 12:01-1 a.m.
5 1:01-2 a.m.
6 2:01 a.m. or later

- 21-22 How will you travel when you leave here? (Check one.)
1 Drive a car
2 Get a ride
3 Take the university shuttle bus
4 Take the Dial-a-Ride service
5 Take the AATA fixed-route bus
6 Take a taxi
7 Walk alone
8 Walk with other person(s)
9 Ride a bicycle
10 Ride a motorcycle or moped
11 Other (please specify)

For office use only
23

- 5 About how many weeknights in an average week are you in this building after 7 p.m.?
(Please indicate number of weeknights)

- 6 Which of these vehicles are generally available for your use? (Check all that apply.)
1 Automobile (driver)
2 Automobile (passenger)
3 Bicycle
4 Motorcycle/Moped
5 None of the above

7 During the past seven days, how many one-way trips within the city limits of Ann Arbor did you make between 11 p.m. and 6 a.m. by each of the following ways of traveling? (A one-way trip is any travel between two points. For example, travel from home to work is one trip, and travel from work back to home is a second trip.)

- a. By driving a car: trips
b. By getting a ride from someone else: trips
c. By the university shuttle bus: trips
d. By taxi: trips
e. By walking alone: trips
f. By walking with other person(s): trips
g. By bicycle: trips
h. By motorcycle or moped: trips
i. By other means (please specify): trips

- 8 What is your main purpose when you travel between 11 p.m. and 6 a.m.? (Check one.)
1 Work
2 Study
3 Other

9 How important is each of these characteristics in your decision of how to travel at night? (Please rank in order of importance from 1 to 4, using 1 for the most important characteristic.)

- Low cost
Short travel time
Protection from the weather
Safety

10 The Ann Arbor Transportation Authority is planning to provide a door-to-door shared-ride taxi service called "Night Ride" within the city limits of Ann Arbor between 11 p.m. and 6 a.m. for a fare of \$1.50.

10A. In an average week, how many one-way trips do you think you will make using Night Ride? (Please indicate number of trips)

HOSPITAL "BEFORE" SURVEY

For office use only
 I Form
 2-5 I.D.
 6-9 Date
 10-13 Time

I.D. No. _____ Date _____
 _____ Time _____

Night Transportation Survey

The Ann Arbor Transportation Authority is conducting a survey of travel during the evening and late night hours. We are interested in how people travel, as well as their attitudes and preferences regarding various means of travel. Please help us by completing this brief survey form.

HAVE YOU PREVIOUSLY COMPLETED AND RETURNED A NIGHT TRANSPORTATION SURVEY?

- 14 No Yes → Where did you receive the previous survey?
 15 1 By mail 4 University Hospital
 2 Undergraduate Library 5 Dial-A-Ride
 3 Graduate Library 6 Regular AATA fixed-route bus

If you completed and returned the previous survey, please complete only the above information and return this form to the surveyor. Thank you.

- 16-20 **1** What time did you arrive at the hospital?
 _____ a.m. (Please indicate time and
 _____ p.m. circle a.m. or p.m.)
- 21-22 **2** How did you make your trip here? (Check one.)
 1 Drove a car 7 Walked alone
 2 Got a ride from someone 8 Walked with other person(s)
 3 Took the university shuttle bus 9 Rode a bicycle
 4 Took the Dial-a-Ride service 10 Rode a motorcycle or moped
 5 Took the AATA fixed-route bus
 6 Took a taxi 11 Other _____ (please specify)
- 23-27 **3** What time do you plan to leave the hospital?
 _____ a.m. (Please indicate time
 _____ p.m. and circle a.m. or p.m.)
- 28-29 **4** How will you travel when you leave here? (Check one.)
 1 Drive a car 7 Walk alone
 2 Get a ride 8 Walk with other person(s)
 3 Take the university shuttle bus 9 Ride a bicycle
 4 Take the Dial-a-Ride service 10 Ride a motorcycle or moped
 5 Take the AATA fixed-route bus
 6 Take a taxi 11 Other _____ (please specify)
- 30 **5** Which of these vehicles are generally available for your use?
 31 (Check all that apply.)
 32 1 Automobile (driver) 4 Motorcycle/Moped
 33 2 Automobile (passenger) 5 None of the above
 34 3 Bicycles

For office use only

6 During the past seven days, how many one-way trips within the city limits of Ann Arbor did you make between 11 p.m. and 6 a.m. by each of the following ways of traveling? (A one-way trip is any travel between two points. For example, travel from home to work is one trip, and travel from work back to home is a second trip.)

- a. By driving a car: _____ trips 35-36
 b. By getting a ride from someone else: _____ trips 37-38
 c. By the university shuttle bus: _____ trips 39-40
 d. By taxi: _____ trips 41-42
 e. By walking alone: _____ trips 43-44
 f. By walking with other person(s): _____ trips 45-46
 g. By bicycle: _____ trips 47-48
 h. By motorcycle or moped: _____ trips 49-50
 i. By other means _____ : _____ trips 51-52
 (please specify)

7 How important is each of these characteristics in your decision of how to travel at night? (Please rank in order of importance from 1 to 4, using 1 for the most important characteristic.)

- _____ Low cost 53
 _____ Short travel time 54
 _____ Protection from the weather 55
 _____ Safety 56

8 The Ann Arbor Transportation Authority is planning to provide a door-to-door shared-ride taxi service called "Night Ride" within the city limits of Ann Arbor between 11 p.m. and 6 a.m. for a fare of \$1.50.

8A. In an average week, how many one-way trips do you think you will make using Night Ride?
 _____ (Please indicate number of trips) 57-58

8B. How do you now make the trips that you plan to make on Night Ride? (Check all that apply.)

- 1 By driving a car 59
 2 By getting a ride 60
 3 By taking the university shuttle bus 61
 4 By taking a regular taxi 62
 5 By walking alone 63
 6 By walking with other person(s) 64
 7 By riding a bicycle 65
 8 By riding a motorcycle or moped 66
 9 I do not plan to use 67

8C. When Night Ride begins, will you...

- Yes No Don't Know
-
- a. Travel later at night than you do now?
-
- b. Make your trips after 11 p.m. to different locations?
-
- c. Increase the total number of trips you make after 11 p.m.?
-

9 Please indicate which of the following best applies to you. (Check one.)

- 1 I work rotating shifts
- 2 Regular Day shift employee
- 3 Regular Evening shift employee
- 4 Regular Night shift employee
- 5 Other (please specify)

10 Please indicate your general job classification:

- 1 Nursing staff (does not include head nurses, assistant head nurses, or LPN's)
- 2 Technicians (includes LPN's, laboratory technicians, etc.)
- 3 House Officers (includes residents and interns, etc.)
- 4 Medical Staff (attending physicians, etc.)
- 5 Professional and Administrative staff (includes head nurses, assistant head nurses, and supervisors, etc.)
- 6 Office staff (includes ward clerks and unit clerks, etc.)
- 7 Trades Workers (includes electricians and painters, etc.)
- 8 Service and Maintenance staff (includes cafeteria and custodial workers, etc.)
- 9 Other (please specify)

The following questions are necessary for statistical purposes. The information provided will remain strictly confidential.

11 Are you?

- 1 Male
- 2 Female

12 What is your age?

- 1 Under 16
- 2 16-24
- 3 25-44
- 4 45-64
- 5 65 or over

13 What is the combined annual income of all of the members of your household?

- 1 Less than \$10,000
- 2 \$10,000-\$19,999
- 3 \$20,000-\$29,999
- 4 \$30,000-\$39,999
- 5 \$40,000-\$49,999
- 6 \$50,000 or more

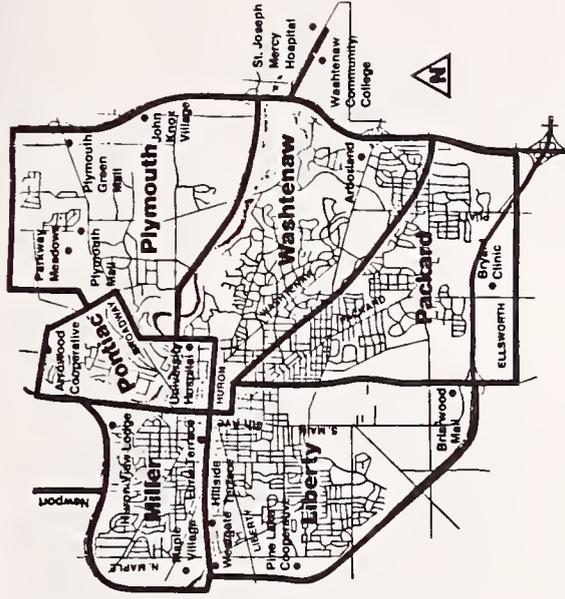
14 Do you live on the university campus?

- 1 Yes, on the Central Campus → Go to Q.16
- 2 Yes, on the North Campus → Go to Q.16
- 3 No

15

Below is a map of the City of Ann Arbor, divided into zones that correspond to the zones used by the Dial-A-Ride service. Please look at the map and indicate the name of the zone in which your residence is located.

- 1 Liberty
- 2 Miller
- 3 Packard
- 4 Plymouth
- 5 Pontiac
- 6 Washtenaw
- 7 I do not live within the City limits. I live in _____ (please specify)



16

WE WILL BE DOING A SECOND SURVEY AFTER "NIGHT RIDE" BEGINS. IT WOULD BE VERY HELPFUL TO US IF YOU WOULD AGREE TO PARTICIPATE IN THIS SECOND SURVEY.

IF YOU WOULD BE WILLING TO ANSWER THE SECOND SURVEY, PLEASE INDICATE YOUR NAME, ADDRESS AND TELEPHONE NUMBER BELOW. THANK YOU FOR YOUR HELP.

NAME _____

ADDRESS _____

PHONE NUMBER _____ (days) _____ (evenings)

SUGGESTED DAYS OF THE WEEK AND TIMES TO CALL: _____

THANK YOU AGAIN FOR YOUR COOPERATION

68
69
70

71

72-73

74

75

76

77

I.D. No. _____ Date _____ Time _____

Dial-A-Ride Service Passenger Survey

The Ann Arbor Transportation Authority is conducting a survey of travel during the evening and late night hours. We are interested in how people travel, as well as their attitudes and preferences regarding various means of travel. Please help us by completing this brief survey form.

After completing the form, please fold, place in envelope provided and deposit in a mailbox. No postage is necessary.

1. Have you previously completed and returned a night transportation survey? No Yes

- Where did you receive the previous survey?
1 By mail
2 Undergraduate Library
3 Graduate Library
4 University Hospital
5 Dial-A-Ride
6 Regular AATA fixed-route bus

If you completed and returned the previous survey, please complete only the above information and return this form to the surveyor. Thank you.

2. Where did you board this bus?

- 1 At the downtown transfer point
2 I was picked up in Zone _____

3. If you boarded the bus at the downtown transfer point, how did you get to the transfer point?

- 1 By Dial-A-Ride from Zone _____
2 By AATA fixed-route bus
3 By walking alone
4 By walking with other person(s)
5 By car
6 By other means _____

4. What type of place or activity are you coming from?

- 1 Your home
2 Work
3 School
4 Shopping/Errands
5 Doctor/Dentist
6 Visiting Friends/Relatives
7 Other _____

For office use only
Card 1
1 Form
2-5 ID
6-9 Date
10-13 Time

3. Where will you get off this bus?

- 1 At the downtown transfer point
2 I will be dropped off in Zone _____

3A. If you will get off the bus at the downtown transfer point, how will you get from the transfer point to your destination?

- 1 By Dial-A-Ride to Zone _____
2 By AATA fixed-route bus _____
3 By walking alone _____
4 By walking with other person(s) _____
5 By car _____
6 By other means _____

4. What type of place or activity are you going to?

- 1 Your home
2 Work
3 School
4 Shopping/Errands
5 Doctor/Dentist
6 Visiting Friends/Relatives
7 Other _____

5. When do you plan to leave that place or activity?

a.m. (Please indicate time)
p.m. and circle a.m. or p.m.)

6. How will you travel when you do leave that place or activity?

- 1 Drive a car
2 Get a ride
3 Take the university shuttle bus
4 Take the Dial-A-Ride
5 Take the AATA fixed-route bus
6 Take a taxi
7 Walk alone
8 Walk with other person(s)
9 Ride a bicycle
10 Ride a motorcycle or moped
11 Other _____

7. Which of these vehicles are generally available for your use? (Check all that apply)

- 1 Automobile (driver)
2 Automobile (passenger)
3 Bicycle
4 Motorcycle/Moped
5 None of the above

8. If you had not used the Dial-A-Ride service this evening, how would you have made this trip? (Check one.)

- 1 By using the AATA fixed-route bus
2 By driving a car
3 By getting a ride from someone else
4 By the university shuttle bus
5 By taxi
6 By walking alone
7 By walking with other person(s)
8 By bicycle
9 By motorcycle or moped
10 By other means _____
11 I would not have made this trip _____

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21-22
23-24

9. During the past seven days, how many one-way trips within the city limits of Ann Arbor did you make between 7 p.m. and 11 p.m. by each of the following ways of traveling? (A one-way trip is any travel between two points. For example, travel from home to work is one trip, and travel from work back to home is a second trip.)

- a. By using the Dial-A-Ride: _____ trips
b. By driving a car: _____ trips
c. By getting a ride from someone else: _____ trips
d. By the university shuttle bus: _____ trips
e. By the AATA fixed-route bus: _____ trips
f. By taxi: _____ trips
g. By walking alone: _____ trips
h. By walking with other person(s): _____ trips
i. By bicycle: _____ trips
j. By motorcycle or moped: _____ trips
k. By other means _____ (please specify) _____ trips

10. During the past seven days, how many one-way trips within the city limits of Ann Arbor did you make between 11 p.m. and 6 a.m. by each of the following ways of traveling? (Please indicate number in space provided.)

- a. By driving a car: _____ trips
b. By getting a ride from someone else: _____ trips
c. By the university shuttle bus: _____ trips
d. By taxi: _____ trips
e. By walking alone: _____ trips
f. By walking with other person(s): _____ trips
g. By bicycle: _____ trips
h. By motorcycle or moped: _____ trips
i. By other means _____ (please specify) _____ trips

11. What is your main purpose when you travel between 11 p.m. and 6 a.m.?

- 1 Work
2 Study
3 Other

12. How important is each of these characteristics in your decision from how to travel at night? (Please rank in order of importance from 1 to 4, using 1 for the most important characteristic.)

- Low cost
Short travel time
Protection from the weather
Safety

13. The Ann Arbor Transportation Authority is planning to provide a door-to-door shared-ride taxi service called "Night Ride" within the city limits of Ann Arbor between 11 p.m. and 6 a.m. for a fare of \$1.50.

13A. In an average week, how many one-way trips do you think you will make using Night Ride? _____ (Please indicate number of trips)

33
34
35
36
37

38-39

Card 2

1
2
3
4

5-6

FOLLOW-UP SURVEY

For office use only

For office use only

1 Form 2-5 I.D. 6-9 Date

I.D. Number _____ Date _____

Night Transportation Follow-Up Survey

This survey is a follow-up to the "Night Transportation Survey" distributed several weeks ago by the Ann Arbor Transportation Authority. Thank you for agreeing to answer some additional questions. This will be very helpful to us in our study of the late night travel of Ann Arbor area residents. Completing the form will take only a few minutes of your time.

1 During the past seven days, how many one-way trips within the city limits of Ann Arbor did you make between 11 p.m. and 6 a.m. by each of the following ways of traveling? (A one-way trip is any travel between two points. For example, travel from home to work is one trip, and travel from work back to home is a second trip.)

- 10-11 a. By driving a car: _____ trips
12-13 b. By getting a ride from someone else: _____ trips
14-15 c. By the university shuttle bus: _____ trips
16-17 d. By taxi: _____ trips
18-19 e. By walking alone: _____ trips
20-21 f. By walking with other person(s): _____ trips
22-23 g. By bicycle: _____ trips
24-25 h. By motorcycle or moped: _____ trips
26-27 i. By AATA Night Ride: _____ trips
28-29 j. By other means (please specify): _____ trips

30 2 What is your main purpose when you travel between 11 p.m. and 6 a.m.? (CHECK ONE.)

- 1 Work
2 Study
3 Visiting Friends/Relatives
4 Other (please specify)

The Ann Arbor Transportation Authority began its "Night Ride" service on March 15. Night Ride is a door-to-door shared ride taxi service that operates within the city limits of Ann Arbor between 11 p.m. and 6 a.m. for a fare of \$1.50.

3 Have you used the Night Ride service?

- 1 Yes, more than once
2 Yes, once GO TO Q.9
3 No GO TO Q.9

IF YOU HAVE USED THE NIGHT RIDE SERVICE MORE THAN ONCE...

4 In an average week, how many one-way trips do you make using Night Ride?

(Please indicate number of trips)

5 How did you previously make the trips that you now make on Night Ride? (CHECK ALL THAT APPLY.)

- 1 By driving a car 34
2 By getting a ride 35
3 By taking the university shuttle bus 36
4 By taking a regular taxi 37
5 By walking alone 38
6 By walking with other person(s) 39
7 By riding a bicycle 40
8 By riding a motorcycle or moped 41
9 Other (please specify) 42
10 I did not make these trips before Night Ride service began 43

6 Has using Night Ride service enabled you to...

- Yes No Don't Know
a. Travel later at night than you did before? 44
b. Make your trips after 11 p.m. to different locations? 45
c. Increase the total number of trips you make after 11 p.m.? 46

10 What would most influence you to use Night Ride service, or to use it more often? (CHECK ONE.)

- 1 If I made more trips after 11 p.m.
- 2 Bad weather
- 3 Lower cost
- 4 Shorter wait time before pick-up
- 5 Shorter travel time
- 6 Other _____ (please specify)
- 7 I am not interested in using Night Ride service

11 We are interested in any opinions you may have regarding Night Ride service. Please use the space below for your comments.

7 What types of places or activities are you generally coming from or going to when you use Night Ride? (CHECK ALL THAT APPLY.)

- 1 Your home
- 2 Work
- 3 School/Study
- 4 Visiting Friends/Relatives
- 5 Other _____ (please specify)

8 What is the main reason you use Night Ride service? (CHECK ONE.)

- 1 Low cost
- 2 Short travel time
- 3 Protection from the weather
- 4 Safety
- 5 Other _____ (please specify)

GO TO Q.10

9 IF YOU HAVE NOT USED NIGHT RIDE SERVICE, OR HAVE USED IT ONLY ONCE...

Why haven't you used Night Ride, or used it more often? (CHECK ALL THAT APPLY.)

- 1 I usually don't travel after 11 p.m.
- 2 I have other travel means available
- 3 I (would) only use Night Ride in bad weather
- 4 Night Ride service is too expensive
- 5 I (would) have to wait too long to be picked up on Night Ride
- 6 I (would) spend too much time traveling on Night Ride
- 7 Other _____ (please specify)

THANK YOU VERY MUCH FOR YOUR COOPERATION

CONTINUE WITH Q.10 AND Q.11



APPENDIX B

USER SURVEYS

This appendix provides a brief overview of the user surveys, the results of which were discussed in depth in the report.

B.1 Description of the User Survey Effort

User surveys took place in 1983 about one year after the initiation of service. Mailback surveys were distributed over two weeks in February and resulted in 52 responses. To overcome possible biases in the response, in-vehicle interviews were conducted on several nights in April and resulted in 66 responses.* Generally it is believed that the latter is less biased, although for certain questions the influence of responding in public introduces an additional bias in the interviews. The samples are much smaller than desired; further surveys are considered infeasible particularly to try and reach the least frequent users. In most respects the two surveys yielded similar results. The total number of unduplicated users of Night Ride was estimated at 350 (during the time of the surveys) and therefore our 95% confidence intervals about proportions (of 20-50%) are $\pm 15\%$.

B.2 Results of the After Surveys

Demographic Profile of Users

The mailback and in-vehicle user surveys indicate that Night Ride users are more likely to be female, full-time employed and young adults. Note that 92% of respondents were aged 16-44, and that over 60% were female.

Travel Behavior

There are many occasional users of Night Ride. Overwhelmingly, passengers use Night Ride for a one-way trip (90%); most passengers use it to return home (66%). The majority of trips are to or from work: 18% of destinations and 31% of origins were workplaces. Surprisingly, only 2% of destinations and 3% of origins were reported to be bars or restaurants. The majority of users used Night Ride for a single trip purpose.

Respondents to the surveys indicated low cost as the primary reason for using Night Ride (over 40% in each survey). Safety was the second most frequently reported reason in the mailback survey (33%) but appeared to be much less important in the in-vehicle interviews. It is not clear to what extent this discrepancy may be due to bias in the mailback response or to embarrassment on the part of respondents in

* There may be some overlap, however the degree is unknown.

in-vehicle interviews. Pre-implementation surveys indicated that safety was the key reason university students and hospital workers would use Night Ride, while low cost was key for evening Dial-a-Ride users who typically have lower incomes. A follow-up survey of university students shortly after service start-up confirmed that safety was the primary reason that members of this group used Night Ride (60% of respondents indicated safety). One may conclude that although the primary reason for implementing Night Ride was to provide a safe travel means for women, the service has found additional nighttime travel markets due to its low cost compared with exclusive taxi service.

Alternative Modes and Diverted Trips

Some Night Ride passengers rely on the service exclusively for their nighttime travel, while others have access to automobiles, rides from others, and taxis or make nighttime trips on foot. The mailback and in-vehicle respondents differed substantially in the availability of rides from others and the distribution of other modes used for the intercepted trip. About half of the users reported that they usually have no alternative modes. The in-vehicle interviews indicate that 33% of users usually have the option of driving an automobile for nighttime trips. Although some of these individuals may perceive Night Ride as safer or cheaper than automobiles or are using Night Ride because it enables them to take advantage of public transportation or carpools for the other half of the roundtrip, most of those who reported that they usually had automobile alternatives did not have an alternative on the night of their Night Ride trip.

Night Ride users are drawn from a number of sources. A small portion of riders did not travel before Night Ride due to a lack of transportation and about one in every four or five passengers previously walked.



Ann Arbor
Transportation Authority

NIGHT RIDE PASSENGER SURVEY

For
office
use
only

The Ann Arbor Transportation Authority is conducting this survey of Night Ride passengers to determine how well the service is meeting your night-time travel needs. Please help us serve you by completing this brief questionnaire and mailing it back (just fold and seal, no postage needed).

1-3 I.D.

1 Have you already completed an identical survey questionnaire? 4

1. YES \longrightarrow If YES, please check "YES" and mail this form to the AATA.

2. NO \longrightarrow If NO, please continue.

2 What type of place or activity were you coming from when you received this survey? (Your Origin) 5

- | | |
|--|--|
| 1. <input type="checkbox"/> Your Home | 5. <input type="checkbox"/> Educational Activity |
| 2. <input type="checkbox"/> University Job | 6. <input type="checkbox"/> Visit to Bar/Restaurant |
| 3. <input type="checkbox"/> Hospital Job | 7. <input type="checkbox"/> Other Social/Recreational Activity |
| 4. <input type="checkbox"/> Other Job | 8. <input type="checkbox"/> Other _____ |
- (Specify)

3 What type of place or activity were you going to when you received this survey? (Your Destination) 6

- | | |
|--|--|
| 1. <input type="checkbox"/> Your Home | 5. <input type="checkbox"/> Educational Activity |
| 2. <input type="checkbox"/> University Job | 6. <input type="checkbox"/> Visit to Bar/Restaurant |
| 3. <input type="checkbox"/> Hospital Job | 7. <input type="checkbox"/> Other Social/Recreational Activity |
| 4. <input type="checkbox"/> Other Job | 8. <input type="checkbox"/> Other _____ |
- (Specify)

4 How many one-way trips did you make on Night Ride in the past seven days to/from this same activity? 7-8

_____ trips (count round trips as two trips)

5 How else do you make this trip at night? (Check all that apply.) 9-13

- | | |
|--|--|
| 1. <input type="checkbox"/> Always Use
Night Ride | 6. <input type="checkbox"/> Regular Taxi |
| 2. <input type="checkbox"/> Walk Alone | 7. <input type="checkbox"/> University Shuttle Bus |
| 3. <input type="checkbox"/> Walk with Others | 8. <input type="checkbox"/> Bicycle |
| 4. <input type="checkbox"/> Drive | 9. <input type="checkbox"/> Motorcycle/Moped |
| 5. <input type="checkbox"/> Get a Ride | 10. <input type="checkbox"/> Other _____ |
- (Specify)

6 What is the main reason you chose to use Night Ride for this trip? (Check one.) 14

- | | |
|---|--|
| 1. <input type="checkbox"/> Safety | 4. <input type="checkbox"/> Weather Protection |
| 2. <input type="checkbox"/> Speed/Travel Time | 5. <input type="checkbox"/> Other _____ |
| 3. <input type="checkbox"/> Cost | |
- (Specify)

OVER

14 How did you first learn about Night Ride? (Check one.) 32

1. <input type="checkbox"/> Radio	4. <input type="checkbox"/> Saw Brochure
2. <input type="checkbox"/> Newspaper	5. <input type="checkbox"/> Saw Ad on AATA Bus
3. <input type="checkbox"/> Friend Recommended	6. <input type="checkbox"/> Other _____

(Specify)

15 Which of these vehicles are generally available for your use at night? (Check all that apply.) 33-36

1. <input type="checkbox"/> Automobile (driver)	4. <input type="checkbox"/> Motorcycle/Moped
2. <input type="checkbox"/> Automobile (passenger)	5. <input type="checkbox"/> None of the Above
3. <input type="checkbox"/> Bicycle	

Questions 16-19 are necessary for statistical purposes. The information provided will remain strictly confidential. 37

16 Are you . . . ?

1. <input type="checkbox"/> Male	2. <input type="checkbox"/> Female
----------------------------------	------------------------------------

17 What is your age? 38

1. <input type="checkbox"/> Under 16	4. <input type="checkbox"/> 45-64
2. <input type="checkbox"/> 16-24	5. <input type="checkbox"/> 65 or over
3. <input type="checkbox"/> 25-44	

18 Please indicate which of the following applies to you. (Check all that apply.) 39-42

1. <input type="checkbox"/> Full-time Employed	5. <input type="checkbox"/> Homemaker
2. <input type="checkbox"/> Part-time Employed	6. <input type="checkbox"/> Retired
3. <input type="checkbox"/> Undergraduate Student	7. <input type="checkbox"/> Unemployed
4. <input type="checkbox"/> Graduate Student	8. <input type="checkbox"/> Other _____

(Specify)

19 What is the combined annual income of all the members of your household? (Undergraduates: Please indicate your family income category.) 43

1. <input type="checkbox"/> Less than \$10,000	4. <input type="checkbox"/> \$30,000-\$39,999
2. <input type="checkbox"/> \$10,000-\$19,999	5. <input type="checkbox"/> \$40,000-\$49,999
3. <input type="checkbox"/> \$20,000-\$29,999	6. <input type="checkbox"/> \$50,000 or more

20 Do you have any suggestions to improve Night Ride? 44

NIGHT RIDE USER "AFTER" IN-VEHICLE INTERVIEW

I.D.

/ Date

: Time

Night Ride Passenger Interview

Hello, I'm conducting interviews of Night Ride passengers for the Ann Arbor Transportation Authority to determine if the service is meeting your night-time travel needs. Would you be willing to answer a few questions anonymously?

← IF NO, CHECK THIS BOX AND END THE INTERVIEW.

- 1** Have you already been interviewed, in person, on Night Ride?
1. YES----- If YES, please check "YES" and end the interview.
 2. NO----- If NO, continue.

IF THE RESPONDENTS INDICATE THAT THEY HAVE ALREADY COMPLETED A WRITTEN SURVEY, EXPLAIN THAT THEIR RESPONSE TO THIS INTERVIEW IS NEEDED TO COMPLETE THE STUDY.

2 What type of place or activity are you coming from?

- | | |
|-------------------|--------------------------------|
| 1. Your Home | 5. Educational Activity |
| 2. University Job | 6. Visit to Bar/Restaurant |
| 3. Hospital Job | 7. Other Social/Recr. Activity |
| 4. Other Job | 8. Other _____ |
- (Specify)

3 What type of place or activity are you going to?

- | | |
|-------------------|--------------------------------|
| 1. Your Home | 5. Educational Activity |
| 2. University Job | 6. Visit to Bar/Restaurant |
| 3. Hospital Job | 7. Other Social/Recr. Activity |
| 4. Other Job | 8. Other _____ |
- (Specify)

4 Did this vehicle arrive to pick you up on time, early or late?

1. Early
2. Late
3. On time

How many minutes early or late?

5 Did you call for your Night Ride vehicle more than one hour in advance of your desired departure time?

1. Yes-----GO TO QUESTION 7
2. No

6 How many minutes in advance of your desired departure time did you call to request your Night Ride pick up? (If requested immediate service, write zero)

22 23 24

7 How else do you make this trip at night? (Probe; several answers possible)

25 26 27

28 29

1. Always Use Night Ride
2. Walk Alone
3. Walk with Others
4. Drive
5. Get a Ride
6. Regular Taxi
7. University Shuttle Bus
8. Bicycle
9. Motorcycle/Moped
10. Other _____
(Specify)

30

8 What is the main reason you chose to use Night Ride for this trip tonight? (One answer)

1. Safety
2. Speed/Travel Time
3. Cost
4. Weather Protection
5. Other _____
(Specify)

31 32

9 How did you usually make this trip at night before Night Ride came into being in March 1982? (One answer)

1. Couldn't make this trip then because of inadequate transportation
2. Used to make this trip earlier in the evening and used Dial-a-Ride
3. Didn't live in Ann Arbor then
4. Didn't need to make this trip then
5. Walked Alone
6. Walked with Others
7. Drove
8. Got a Ride
9. Regular Taxi
10. University Shuttle Bus
11. Bicycle
12. Motorcycle/Moped
13. Other _____
(Specify)

33 34 35

10 For what other kinds of trips (purposes) do you use Night Ride? (Several Answers Possible)

1. None
2. Work
3. Educational Activity
4. Visit to Restaurant/Bar
5. Other Social/Recr. Activity
6. Other _____
(Specify)

36

11 Will you make any more trips on Night Ride tonight?

1. YES
2. NO

37 38

12 How many total (one-way) trips did you make on Night Ride (for any purpose) in the past seven days, including this trip? Count round trips as two trips.

39 40

13 How many of these trips would you have made using regular taxi service if Night Ride service were not available? Again count round trips as two trips.

41 42

14 On how many of your Night Ride trips in the past seven days have you shared the vehicle with other passengers (whom you did not plan to travel with)? (Not including the interviewer.)

- 15** How has Night Ride affected your tripmaking at night?
 (Probe; several answers possible)
- 46
1. No effect
 2. Use Night Ride instead of other means of transportation
 3. Travel more frequently after 11 p.m.
 4. Travel to different locations after 11 p.m.
 5. Other _____
(Specify)

- 16** Is a motor vehicle or bicycle generally available for your
 use at night? (Probe; several answers possible)
- 50
1. Automobile to drive
 2. Automobile to ride in
 3. Bicycle
 4. Motorcycle/Moped
 5. None

- 17** Sex (do not ask):
- 51
1. Male
 2. Female

THE NEXT FEW QUESTIONS ARE FOR STATISTICAL PURPOSES AND ARE
 NEEDED TO VERIFY THAT THE SURVEY IS AN ACCURATE ONE.

- 18** How old are you?
- 52
1. Under 16
 2. 16-24
 3. 25-44
 4. 45-64
 5. 65 or over

- 19** What is your occupation? (Probe; several answers are
 possible)
- 53 54 55
1. Full-time Employed
as _____
 2. Part-time Employed
 3. Undergraduate Student*
 4. Graduate Student
 5. Homemaker
 6. Retired
 7. Unemployed
 8. Other _____
(Specify)

- 20** Please look at the categories on this card and point to the
 number which corresponds to the category in which your
 annual household income falls. (*If you are an undergradu-
 ate student, please indicate your family's annual income.)
- 56
1. Less than \$10,000
 2. \$10,000 - \$19,000
 3. \$20,000 - \$29,000
 4. \$30,000 - \$39,000
 5. \$40,000 - \$49,999
 6. \$50,000 or more
 7. don't know
 8. refused

- 21** Finally, do you have any suggestions to improve Night Ride?
- 57
-
-

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